JUNE, 1929 NUMBER 262

# THE UNIVERSITY OF NORTH CAROLINA RECORD

## CATALOGUE OF THE GRADUATE SCHOOL

GRADUATE SCHOOL SERIES No. 20

THE UNIVERSITY OF NORTH CAROLINA PRESS
CHAPEL HILL, N. C.

# CALENDAR

| | |
|---|---|
| *1929* | |
| *June 7-10* | *Friday through Monday.* Commencement exercises. |
| *June 13-July 23* | Summer quarter, first term. |
| *July 24-August 30* | Summer quarter, second term. |
| *Sept. 19* | *Thursday.* Registration for the fall quarter. |
| *Sept. 20* | *Friday.* Class work for the fall quarter begins. |
| *Sept. 27* | *Friday.* General meeting of the Graduate School, 8 p.m. Last day for approval of applications for the degree of Ph.D. at commencement of 1930. |
| *Oct. 12* | *Saturday.* University Day exercises. |
| *Nov. 27* | *Wednesday.* Thanksgiving recess begins (1:00 p.m.). |
| *Dec. 2* | *Monday.* Thanksgiving recess ends (8:30 a.m.). |
| *Dec. 18, 19, 20, 21* | *Wednesday, Thursday, Friday, Saturday.* Examinations for the fall quarter. Registration for winter quarter. |
| *Dec. 21 (afternoon)-Jan. 1, 1930* | Christmas recess. |
| *1930* | |
| *Jan. 2* | *Thursday.* Registration completed for the winter quarter. (New students only). |
| *Jan. 3* | *Friday.* Class work for the winter quarter begins. |
| *Jan. 4* | *Saturday.* Regular classes as of Thursday. |
| *Jan. 10* | *Friday.* Applications for admission to candidacy for master's degrees at commencement of 1930 must be approved by this date. Last day for approval of thesis subjects for master's degrees at commencement of 1930. |
| *Mar. 12-15* | *Wednesday through Saturday.* Examinations for the winter quarter. Registration for spring quarter. |
| *Mar. 15-21* | *Saturday afternoon through Friday.* Spring recess. |
| *Mar. 22* | *Saturday.* Registration completed for the spring quarter. (New students only). |
| *Mar. 24* | *Monday.* Class work for the spring quarter begins. |
| *April 26* | *Saturday.* Last day of period for written examinations for master's degrees. |
| *April 30* | *Wednesday.* Last day for submitting theses for the degree of Ph.D. |
| *May 10* | *Saturday.* Master's theses must be submitted. Written examinations for the degree of Ph.D. may not be taken after this date. |
| *June 2-5* | *Monday through Thursday.* Examinations for the spring quarter. |
| *June 6-9* | *Friday through Monday.* Commencement. |

# CONTENTS


Officers of Instruction and Government ..... 5
Historical Statement ..... 10
Beginnings of Graduate Work ..... 11
Fields of Research ..... 12
Languages and Literatures ..... 12
Philosophy and Political and Social Sciences ..... 13
Mathematics and the Sciences ..... 14
Journals of Research ..... 15
The University Press ..... 16
The Library ..... 16
Situation and General Advantages ..... 18
Organization of the Graduate School ..... 20
Admission and Other Information ..... 20
Admission ..... 20
Fees and Expenses ..... 22
Fellowships and Other Aids ..... 22
Research Prizes ..... 23
Institute for Research in Social Science ..... 23
Rooms and Board ..... 24
The University Year ..... 24
General Regulations ..... 25
The Graduate Degree ..... 27
Master of Arts ..... 27
Master of Science ..... 31
Doctor of Philosophy ..... 33
Summary of Requirements ..... 36
Courses of Instruction ..... 37
Botany ..... 37
Chemistry ..... 39
Civil Engineering ..... 42
Classical Languages and Literatures ..... 46
Comparative Literature ..... 49
Economics and Commerce ..... 50
Education ..... 58
Electrical Engineering ..... 63
English ..... 65
Geology ..... 69
Germanic Languages ..... 72
History and Government ..... 74
Mathematics ..... 82
Philosophy ..... 86
Physics ..... 87
Psychology ..... 89
Romance Languages ..... 92
Rural Social-Economics ..... 96
Sociology ..... 98
Zoölogy ..... 102
Additional Courses for Graduate Credit ..... 104
Teaching Fellows, Assistants and Scholars ..... 105



150648

Digitized by the Internet Archive
in 2014

http://archive.org/details/universityofnort262univ

# OFFICERS OF INSTRUCTION AND GOVERNMENT

## THE UNIVERSITY

Harry Woodburn Chase, Ph.D., LL.D., President.
Julius Algernon Warren, Bursar.
Thomas James Wilson, Jr., Ph.D., Registrar.
Eric Alonzo Abernethy, M.D., University Physician.

## THE GRADUATE SCHOOL

James Finch Royster, Ph.D., Dean.
Almonte Charles Howell, Ph.D., Assistant Dean.
Mrs. Dean Lorimer Potter, A.B., Secretary.

### The Administrative Board

William deBerniere MacNider, M.D., Kenan Professor of Pharmacology.
William Chambers Coker, Ph.D., Kenan Professor of Botany.
William Morton Dey, Ph.D., Professor of the Romance Languages and Literatures.
Parker Hayward Daggett, S.B., Professor of Electrical Engineering.
James Munsie Bell, Ph.D., Smith Professor of Chemistry.
Edgar Wallace Knight, Ph.D., Professor of Rural Education.
William Whatley Pierson, Jr., Ph.D., Professor of History and Government.
Gustave Adolphus Harrer, Ph.D., Professor of Latin.
Claudius Temple Murchison, Ph.D., Professor of Applied Economics.

### The Graduate Faculty

Francis Preston Venable, Ph.D., D.Sc., LL.D., Kenan Professor of Chemistry.
Walter Dallam Toy, M.A., Professor of the Germanic Languages and Literatures.
Henry Horace Williams, A.M., B.D., Kenan Professor of Philosophy.
Henry VanPeters Wilson, Ph.D., Kenan Professor of Zoölogy.
Collier Cobb, A.M., D.Sc., Professor of Geology and Mineralogy.
Marcus Cicero Stephens Noble, Pd.D., Professor of Pedagogy and Dean of the School of Education.
Isaac Hall Manning, M.D., Professor of Physiology and Dean of the School of Medicine.
George Howe, Ph.D., Professor of the Latin Language and Literature.

NATHAN WILSON WALKER, A.B., Ed.M., Professor of Secondary Education, Director of the Summer School, and Acting Dean of the School of Education.

WILLIAM DEBERNIERE MACNIDER, M.D., Kenan Professor of Pharmacology.

WILLIAM CHAMBERS COKER, Ph.D., Kenan Professor of Botany.

ARCHIBALD HENDERSON, Ph.D., D.C.L., LL.D., Kenan Professor of Mathematics.

JOSEPH GREGOIRE DEROULHAC HAMILTON, Ph.D., Kenan Professor of History and Government.

HENRY MCGILBERT WAGSTAFF, Ph.D., Professor of History.

WILLIAM MORTON DEY, Ph.D., Professor of the Romance Languages and Literatures.

ALVIN SAWYER WHEELER, Ph.D., Professor of Organic Chemistry.

PARKER HAYWARD DAGGETT, S.B., Professor of Electrical Engineering.

JAMES MUNSIE BELL, Ph.D., Smith Professor of Chemistry.

EUGENE CUNNINGHAM BRANSON, A.M., Litt.D., Kenan Professor of Rural Social-Economics.

DUDLEY DEWITT CARROLL, M.A., Professor of Economics and Dean of the School of Commerce.

FREDERICK HENRY KOCH, A.M., Professor of Dramatic Literature.

JOHN EMERY LEAR, E.E., Professor of Electrical Engineering.

NORMAN FOERSTER, A.M., Professor of English.

EDGAR WALLACE KNIGHT, Ph.D., Professor of Rural Education.

WILLIAM FREDERICK PROUTY, Ph.D., Professor of Stratigraphic Geology.

*HOWARD WASHINGTON ODUM, Ph.D., Kenan Professor of Sociology and Director of the School of Public Welfare.

WILLIAM STANLY BERNARD, A.M., Professor of Greek.

JOHN MANNING BOOKER, Ph.D., Professor of English.

THOMAS FELIX HICKERSON, A.M., S.B., Professor of Civil Engineering.

WILLIAM WHATLEY PIERSON, JR., Ph.D., Professor of History and Government.

JOHN FREDERICK DASHIELL, Ph.D., Professor of Psychology.

STURGIS ELLENO LEAVITT, Ph.D., Professor of Spanish.

JAMES FINCH ROYSTER, Ph.D., Kenan Professor of English Philology and Dean of the Graduate School.

ROBERT DIGGS WIMBERLY CONNOR, Ph.B., Kenan Professor of History and Government.

GUSTAVE MAURICE BRAUNE, C.E., Professor of Civil Engineering and Dean of the School of Engineering.

KENT JAMES BROWN, Ph.D., Professor of German.

*Absent on leave, 1928-1929, on the Kenan Foundation.

Claudius Temple Murchison, Ph.D., Professor of Applied Economics.
Robert Ervin Coker, Ph.D., Professor of Zoölogy.
Marion Rex Trabue, Ph.D., Professor of Educational Administration.
Erle Ewart Peacock, A.B., M.B.A., Professor of Accounting.
Harry Wolven Crane, Ph.D., Professor of Psychology.
Arthur Melville Jordan, Ph.D., Professor of Educational Psychology.
Esek Ray Mosher, Ed.D., Professor of Education.
Thorndike Saville, C.E., M.S., Professor of Hydraulic and Sanitary Engineering.
John Wayne Lasley, Jr., Ph.D., Professor of Pure Mathematics.
Allan Wilson Hobbs, Ph.D., Professor of Applied Mathematics.
Otto Stuhlman, Jr., Ph.D., Professor of Physics.
Gustave Adolphus Harrer, Ph.D., Professor of Latin.
*Erich Walter Zimmerman, Ph.D., Professor of Commerce and Resources.
Frank Porter Graham, M.A., Professor of History and Acting-Director of the Institute for Research in Social Science.
Addison Hibbard, M.A., Professor of English and Dean of the College of Liberal Arts.
George Coffin Taylor, Ph.D., Professor of English.
William John McKee, M.A., Professor of Education in Extension Teaching.
Edward James Woodhouse, B.A., LL.B., Professor of Government.
Howard Mumford Jones, M.A., Professor of English.
Urban Tigner Holmes, Jr., Ph.D., Professor of French.
Mitchell Bennett Garrett, Ph.D., Professor of Modern European History.
Frank Kenneth Cameron, Ph.D., Professor of Chemistry.
Ernest Rutherford Groves, A.B., B.D., Research Professor of Sociology.
Frank Carl Vilbrandt, Ph.D., Professor of Industrial Chemistry.
Harold Diedrich Meyer, A.M., Professor of Sociology and Supervisor of Field Work.
English Bagby, Ph.D., Professor of Psychology.
Wallace Everett Caldwell, Ph.D., Professor of History.
Luther Lee Bernard, Ph.D., Professor of Sociology.
William Flint Thrall, Ph.D., Professor of English.
James Talmage Dobbins, Ph.D., Associate Professor of Chemistry.
Samuel Huntington Hobbs, Jr., A.M., Associate Professor of Rural Economics and Sociology.

*Absent on leave, winter quarter, 1929.

HOWARD RUSSELL HUSE, Ph.B., Associate Professor of Romance Languages.
ARTHUR SIMEON WINSOR, Ph.D., Associate Professor of Mathematics.
JOHN BROOKS WOOSLEY, A.M., Associate Professor of Economics.
HENRY ROLAND TOTTEN, Ph.D., Associate Professor of Botany.
FLOYD HARRIS EDMISTER, Ph.D., Associate Professor of Chemistry.
MALCOLM DEAN TAYLOR, A.B., M.B.A., Associate Professor of Sales Relations.
ERNEST LLOYD MACKIE, Ph.D., Associate Professor of Mathematics.
*CORYDON PERRY SPRUILL, JR., A.B., B.Litt. (Oxon.), Associate Professor of Economics.
EDWARD TANKARD BROWNE, Ph.D., Associate Professor of Mathematics.
ERNST CHRISTIAN PAUL METZENTHIN, Ph.D., Associate Professor of German.
JOEL HOWARD SWARTZ, Ph.D., Associate Professor of Geology.
WILEY BRITTON SANDERS, A.M., Associate Professor of Sociology.
SHIPP GILLESPIE SANDERS, A.M., Associate Professor of Latin.
NICHOLSON BARNEY ADAMS, Ph.D., Associate Professor of Spanish.
JOE BURTON LINKER, Ph.D., Associate Professor of Mathematics.
JOSEPH MERRITT LEAR, M.A., Associate Professor of Insurance.
HERMAN GLENN BAITY, C.E., M.S., Associate Professor of Engineering.
GUSTAV THEODOR SCHWENNING, Ph.D., Associate Professor of Business Administration.
ALMONTE CHARLES HOWELL, Ph.D., Associate Professor of English and Assistant Dean of the Graduate School.
EARLE KEITH PLYLER, Ph.D., Associate Professor of Physics.
GREGORY LANSING PAINE, Ph.D., Associate Professor of English.
WILLIAM DOUGALD MACMILLAN, 3d., Ph.D., Associate Professor of English.
MILTON SYDNEY HEATH, A.M., Associate Professor of Economics.
CARLETON ESTEY PRESTON, Ph.D., Associate Professor of the Teaching of Science.
JAMES PENROSE HARLAND, Ph.D., Associate Professor of Archaeology.
PRESTON COOK FARRAR, M.A., Associate Professor of the Teaching of English.
RALPH WINFRED TYLER, Ph.D., Associate Professor of Education in Extension Teaching.
CLARENCE HEER, Ph.D., Associate Professor of Public Finance.
JOHN NATHANIEL COUCH, Ph.D., Associate Professor of Botany.
ELISHA KENT KANE, Ph.D., Associate Professor of Spanish.

*Absent on leave, 1928-1929.

Howard Frederick Munch, A.M., Associate Professor of the Teaching of Mathematics.
Roy William Morrison, Ph.D., Associate Professor of Education.
Harry DeMerle Wolf, Ph.D., Associate Professor of Economics.
Hannibal Gerald Duncan, Th.D., Ph.D., Acting-Associate Professor of Sociology.
Keener Chapman Frazer, A.M., Assistant Professor of Government.
Horace Downs Crockford, Ph.D., Assistant Professor of Chemistry.
Robert Russell Potter, Ph.D., Assistant Professor of English.
Frederick Phillips Brooks, Ph.D., Assistant Professor of Bio-Chemistry.
Gerald Raleigh MacCarthy, Ph.D., Assistant Professor of Geology.
Harry Albert Haring, Jr., Ph.D., Assistant Professor of Economics.
Hubert Crouze Heffner, A.M., Assistant Professor of English.
Thomas James Wilson III, D. Phil. (Oxon.), Assistant Professor of French.
John Coriden Lyons, Ph.D., Assistant Professor of French.
Paul Woodford Wager, Ph.D., Assistant Professor of Rural Social-Economics.
Fletcher Melvin Green, Ph.D., Assistant Professor of History.
Charles Dale Beers, Ph.D., Assistant Professor of Zoölogy.
Ralph Walton Bost, Ph.D., Assistant Professor of Chemistry.
Collier Bryson Sparger, S.M., Assistant Professor of Accounting.
Stephen Albert Emery, Ph.D., Assistant Professor of Philosophy.
*Louis Booker Wright, Ph.D., Instructor in English.

*Absent on leave, 1928-1929.

# THE GRADUATE SCHOOL

## INTRODUCTION

The recently published *Survey of Research in the Humanistic and Social Sciences* conducted under the direction of the American Council of Learned Societies, by Professor Frederic A. Ogg, (Century Co., 1928) comments upon the work of the Graduate School of the University of North Carolina as follows: "The leadership in the new research movement in the South is traceable to one institution, and to certain men and women in it, namely, the University of North Carolina. The explanation of this leadership seems to lie in an unusually keen appreciation of the possibilities of service to the people of the state, in the presence in the faculty of many vigorous, ambitious, and productive scholars, and in liberal support of research interests by the administrative authorities, facilitated, no doubt, by the notable economic and industrial development which the state has of late experienced."

This interest in research is not altogether a matter of recent growth. Since its inception the University of North Carolina has fostered the spirit of investigation inherent in the clause in the first constitution of North Carolina, adopted in December, 1776, which stated that "all useful learning shall be duly encouraged, and promoted in one or more Universities." Chartered in 1789, the University was formally opened in 1795, the cornerstone of Old East building having been laid October 12, 1793. Apparatus for research in physics and astronomy was purchased in 1792, and a library of a hundred volumes was opened in 1795. The first professorship, established in 1794, was to be held by the "Presiding Professor" of the University who was entitled "Professor of Humanities."

From the foundation of the University, research as well as instruction has been encouraged. The limited library facilities in the early days made possible very little work in the humanities, but on the scientific side the spirit of research was surprisingly active. In 1817 the University published a geological survey of the State of North Carolina, said to be the first report of its kind in the United States. One of the early professors was Elisha Mitchell, a distinguished scientist and author of many articles and several books on geology and mineralogy. Other members of the faculty during the first seventy-five years of the University's history were authors of textbooks and scientific articles in their departments of learning. Laboratory resources were slender; experiments had to be performed by professors and not by the students; but they were performed. After 1876 numerous scientific papers were published by

members of the faculty; several research societies were established at the University, and their proceedings have been published in the learned journals maintained by the institution.

### Beginnings of Graduate Work

The first formal action was taken toward the establishment of graduate study in 1881. President Battle's report in that year called attention to the fact that the University was maintaining special schools of law, medicine, and pharmacy, and that the academic faculty would furnish postgraduate instruction leading to the degrees of master of arts and doctor of philosophy. These degrees would not be conferred "except upon rigid examination on prescribed courses." The first degrees of master of arts and doctor of philosophy in course were granted in 1883. In 1885 the first Graduate Bulletin was issued, a circular stating the requirements for advanced degrees in constitutional law, political economy, classical languages and literature, English language and literature, French, German, mathematics, chemistry, natural philosophy, and geology, botany, and zoölogy.

At about the same time (1883) the impulse to further research at the University gained new strength through the establishment of the Elisha Mitchell Scientific Society. For the first three years the Society published annual volumes of proceedings; afterwards the journal became a quarterly. From the first the society has stressed original research on the part of its professors and advanced students and has been an immense aid to higher scientific work at the University. The Philological Club established an annual record of research, called *Studies in Philology,* in 1906. The *James Sprunt Historical Studies,* founded in 1899, gave opportunity for the publication of the results of advanced research in history, particularly in the history of North Carolina.

The establishment of these three learned journals in the fields of science, history, and philology, together with the activities of the research clubs which have held monthly meetings now for many years, afforded a great stimulus to investigation at the University and increased recognition of the importance of graduate work. In 1904 the graduate department was formally organized as a distinct school of the University and Professor C. Alphonso Smith was appointed as its first dean.

For more than a century the spirit of investigation has been a very real element in the life of the University; it has constituted a tradition of rich value from which future work is to derive inspiration and authority. In days of limited equipment, remote from great libraries and laboratories, working under conditions that would have quenched a spirit less vital, members of the University were nevertheless impelled to devote themselves to research. No

proper estimate either of the history of the University or of its life today can be made without taking into account the sincerity and worth of this achievement.

## FIELDS OF RESEARCH

Information concerning the laboratories and scientific equipment, and the library facilities afforded graduate students will be found in the various departmental statements at another place in this catalogue. Some of the fields in which conspicuous contributions to learning have been made in recent years are as follows:

### Languages and Literatures

The Department of Classics in the recent past has centered its researches in the fields of Latin literature—particularly the poetry of the first century B.C. and the historical writings—and of Roman political institutions. The addition of a new member to the staff now gives assurance of promoting studies also in classical art and archæology.

In Comparative Literature, attention has been given especially to the Renaissance in the several countries of Europe and to the romantic movement in Europe and America.

The special fields which have been emphasized for investigation in the Department of English are Middle English, the Renaissance, the English drama, and American literature. Library facilities in these subjects have been built up to a reasonably adequate position. Some of the doctoral dissertations recently accepted by the Department are: "Some Immediate English Influences upon the Faerie Queene, Books I-III"; "Reflections of Current Social and Political Conditions in Milton's Major Poetry"; "The Noble Savage as a Literary Theme"; "Planche's Extravaganzas"; "A Discussion of the Use of *Should* and *Would* as Notional and Auxiliary Verbs"; Elizabethanism in Victorian Poetic Drama"; "The Influence of the German Tale on the Tales of Irving, Hawthorne, and Poe"; "A Study of Henry David Thoreau as a Critic of Literature"; "Vaudeville Elements in English Drama from the Origins until the Closing of the Theatres in 1642."

The Department of Germanics has for a number of years done research work in regard to the Old Saxon epic, the *Heliand,* and has published articles on its author, home, and extant manuscripts.

There is now in preparation a photostatic edition of the two extant fragments in Rome and Prague, together with the parallel passages from the two complete manuscripts in London and Munich.

The Department of Romance Languages has devoted itself particularly to investigations in Renaissance and Medieval French literature, romance linguistics, and French romanticism. In the

field of Spanish the stress has been laid upon romantic drama, Old Spanish, and Spanish-American literature. A full array of courses is offered in these specialties and in the general field as well. Recent doctoral dissertations are: "The Doctrine of Literary Obscurity in the French Renaissance"; "An Edition of *Les Chétifs,* an Old French Crusade Epic, with introduction, variants, and notes." Others now in progress are: "*The Romance of the Rose* in the Middle French Period"; "The Style of Stendahl"; "An Edition of *Ogur le Danois*"; "The Medieval French Element in the French Classical Comedy"; "The Life and Works of Gil de Zárate"; and "The Dramatic Works of Martinez de la Rosa."

### Philosophy and Political and Social Sciences

Investigations of problems of immediate regional concern are characteristic of the departments of Economics and Commerce, Rural Social-Economics, and Sociology. Aspects of the labor problem, commercial geography, port and terminal control, transportation, and business cycles, as well as specific matters of importance to southern manufacturing and commerce, form one aspect of the work of these departments. In some of these investigations other departments coöperate, such as Chemistry, Geology, and Engineering. County and municipal government is studied from one point of view by the Department of History and from a different angle, based on field work as well as books and documents, by the Department of Rural Social-Economics. A very large number of reports on these and similar subjects are made by students and members of the staff each year, and are distributed in printed form. In Sociology, attention is at present directed toward studies of the family, social theory, race, crime, mill villages, and human geography. Many of these studies are directed or aided by grants made by the Institute for Research in Social Science, which is supported by substantial funds. Ten research assistants besides the departmental staffs are engaged in the investigation of matters affecting social welfare in the south.

The Department of History has for many years been primarily interested in various aspects of southern history, state history, Hispanic-American history and government, and American history and government, and has published many books and monographs in these fields. With the acquisition, recently, of the Weeks Collection, it now possesses excellent facilities for further work. In connection with the North Carolina Historial Commission at Raleigh, which also publishes a series of valuable monographs and books, the department finds opportunity for both research and publication.

In Education, research is carried on in the history of education in the South; in specialized aspects of educational psychology, such

as the psychology of discipline, of learning, and of individual differences; in elementary education; in secondary education; and in the various aspects of educational administration and supervision. The research problems on which members of the School of Education are working have been taken directly from the public educational institutions of the state and section. The problems considered during the past few years have concerned the teachers, the courses of study, the results of instruction, the organization, the administration, and the supervision of elementary, secondary, and collegiate institutions. Special attention has been given recently to the results of instruction in English, to the organization and conduct of secondary schools and teacher training institutions, and to the history of present conditions in southern schools. The Bureau of Educational Research serves as a permanent center for organizing, conducting, and assembling the results of all types of educational research projects. Through this bureau many public school officials and sectional organizations have been stimulated, assisted, and directed in significant investigations of vital educational problems.

### Mathematics and the Sciences

Research in Botany has included studies of the flora of the Carolinas, and of the reproduction and physiology of the higher fungi and water-molds. Contributions from the department appear at frequent intervals. In recent years these have been concerned chiefly with fungi, and include two books and numerous monographs of genera. In Zoölogy, the principal lines of investigation have been the embryology and regenerative processes in sponges, coelenterates, and the lower vertebrates, the systematic zoölogy of sponges and crustacea, and the life-cycles of protozoa. Numerous monographs embodying the results of these investigations, have appeared in the zoölogical journals.

The Department of Pharmacology has contributed many monographs on acute and chronic Bright's disease, on the toxicity of anaesthetics and its prevention, and on the influence of age on certain physiological conditions. Studies concerning the influence of the age of an organism in maintaining the acid-base equilibrium of the blood, as well as studies on the toxaemias of pregnancy, are also being carried on.

In Chemistry, some of the lines of work are the chemistry of dyes and intermediates, physical properties of explosives and intermediates, chemistry of rare earths, utilization of wastes, utilization of local coal, and investigations of analytical methods.

Engineering research projects of considerable importance are being carried on by the School of Engineering. For the past five years a series of experiments as a joint project of the United States Bureau of Public Roads, the North Carolina State Highway Com-

mission, and the University has been conducted on a large scale to determine the earth pressure on culvert pipe. Data have been obtained that will be of much value to practicing engineers. Studies relating to water purification have been made in the sanitary engineering laboratory, and investigations of rainfall and stream flow in North Carolina have been carried on in coöperation with the North Carolina Geological and Economic Survey. A study of filter sands has been made. Other studies in the field of Sanitary Engineering have been formulated and the preliminary work on the investigations has been completed. These studies are as follows: (a) Investigation of effects of dye wastes on sewage treatment processes, and possible methods of treatment of these wastes to render them suitable for discharge into sewerage systems. (b) Studies on sedimentation and sludge digestion with sewages containing abnormal grease content. (c) Studies on the uses of chlorine in sewage treatment processes.

In Geology twelve different research projects are now being carried on. Seven of these deal with the geology of North Carolina and five are outside the state but in eastern or southeastern United States. These investigations range from pure science to practical problems in economic geology. A list of the investigations now under way is to be found in the general discussion of the Department of Geology, pages 69-70.

In the Department of Mathematics, investigations are carried on in relativity, higher geometry, higher algebra, calculus of variations, and projective differential geometry. The Department of Physics has centered its research on the problems of the structure of matter and infra-red absorption spectra. It possesses special facilities for work in problems dealing with atomic structure, spectrum analysis in the ultra-violet, infra-red, and allied problems.

Investigation in the field of Psychology has in the past followed three lines especially: the analysis of cases of psychopathy, human habit-forming in its more complicated phases, and the analysis of technique for measuring animal intelligence. Special encouragement is now also to be given research in problems of personnel. Research studies of both faculty and advanced students in this department have appeared from time to time in leading psychological journals.

## JOURNALS OF RESEARCH

Five journals devoted to research in different fields of learning are maintained by the University. *The Journal of the Elisha Mitchell Scientific Society,* now in its forty-fourth volume, has published a very large number of scientific papers, particularly in chemistry, botany, and zoölogy, and is regarded in this country and abroad as one of the most distinguished journals of its kind. The *James Sprunt Historical Studies,* now in its twentieth volume, is a

series of original papers chiefly on North Carolina history, contributed by professors and advanced students in the Department of History. *Studies in Philology,* now in its twenty-sixth volume, originally was limited to the publication of research in philology carried on by members of the language departments at the University. In 1915 it became a quarterly, and now admits to its pages articles by scholars in other universities as well as by members of the language departments of the University. In April of each year it publishes a series of papers dealing with English literature of the sixteenth and seventeenth centuries, called "Elizabethan Studies." The journal is now recognized as one of the foremost American journals of philology. *The North Carolina Law Review* and *Social Forces* were added to the list of research journals published by the University in 1922, and all these journals are now issued by the University of North Carolina Press, established in 1922.

## THE UNIVERSITY PRESS

The journals of research published by the University are issued by the University of North Carolina Press. In addition, the Press publishes books and monographs of research, as well as textbooks and general literature. The major purpose of the Press is to give the University standing in the field of publishing commensurate with its standing in the field of teaching and investigation. It also provides, through books as well as through the scholarly journals, for the publication of the results of investigations carried on by members of the faculty and advanced students. But it is by no means limited, in accepting manuscripts, to work submitted by members of the University group. Books of distinction by scholars connected with other institutions may be published by it; thus the Press is a valuable aid in the development of that aspect of the University's service which has to do with the advancement of learning.

## THE LIBRARY

Under construction at the present time is a new library building, of generous size and convenient arrangement, which will be occupied at the beginning of the season in 1929-1930. The first unit of this book workshop is to cost more than $625,000; it will house half a million books; provision has been particularly made in it for the convenience of graduate students by the construction of more than one hundred cubicles within the stack rooms and of several seminar rooms close to the bookshelves. The new library has been placed near the buildings in which instruction in the languages is given.

The general library of the University contains over 200,000 volumes, constituting one of the largest collections in the South.

It has been built up with great care, the purpose being to make of it an effective working library, a laboratory for the use of students in those departments in which research must be carried on mainly by means of books, as well as an instrument contributing to general culture. The foundations having been laid, it is expected that the next few years will see great expansion in those departments of the Library which supply the materials for investigation. The fund for the purchase of books, journals, and the transactions of learned societies for 1928-1929 is more than $40,000, and about 15,000 volumes, many of them secured abroad, are being added annually. Already valuable special collections are in the possession of the Library. Notable among these are the collection of North Caroliniana, which contains several thousand volumes and constitutes the most complete library of North Carolina history and literature in existence; the chemistry collection, which in number of complete sets of American, English, German, French, and Italian periodicals is unequaled in the South; the rural social-economics collection; the English collection, which contains the complete publications of most of the important societies interested in the study of the English language and literature, the recently acquired C. Alphonso Smith library of Southern literature and the Pendleton King collection; the Nash collection of books relating to romance languages and literature; and the Elisha Mitchell Scientific Society collection, comprising the exchanges received since 1884 from more than two hundred of the leading scientific societies throughout the world.

There are several departmental libraries, especially for the scientific departments. The law library, containing seven thousand five hundred volumes, is at present placed in the building occupied by the Law School. It contains material useful to students of history and government. Advanced students also have the privilege of using the valuable manuscripts of the State Historical Commission and the State Library, both of which are housed in a beautiful and commodious building in Raleigh. The Economics and Commerce departmental library now has a carefully chosen collection of about 4,500 volumes. It receives regularly over 100 trade and financial journals, which include the leading publications in this field. Since the autumn of 1924, this departmental library has had available over $3,000 annually for expenditure on books, periodicals, and statistical services.

The University Library receives about twenty-five hundred periodicals annually. The learned journals which record contemporary research in all the great fields of investigation, such as the sciences, history and economics, philosophy and sociology, classical and modern foreign languages and literatures, and English philology, folk-lore, and literature, are available. The Library

is a member of important philological, bibliographical, and scientific associations, and receives their publications regularly. Bound volumes of most periodicals of permanent worth are available from the beginnings of their publication, constituting a working collection of great value to advanced students. The Library also receives the publications of such organizations as the Smithsonian and Carnegie Institutions, the Rockefeller Institute, and the Russell Sage Foundation, and of all universities, including foreign universities, which issue monographs of advanced research. It also enjoys the privilege, through an inter-library loan arrangement, of borrowing from other libraries, for the use of graduate students, publications which it does not possess. The Library is the regional depository of the card catalogue of the Library of Congress. A collection of 366 volumes of incunabula has recently been acquired through the Hanes Foundation for the Study of the Origin and Development of the Book, and through a grant from the Carnegie Corporation extensive additions to the Library's bibliographical resources will be available in 1929-1930.

Graduate students are given, on application, cards of admission to the book stacks, so that they have immediate access to the stores of the Library. There are also in the library building seminar rooms for the various departments offering instruction in the Graduate School.

## SITUATION AND GENERAL ADVANTAGES

The University is situated at Chapel Hill, twelve miles from Durham and thirty miles from Raleigh. It may be reached by rail from University Junction, or by one of the automobile lines which maintain frequent schedules from Durham. It is near the center of the state, midway between the mountains and the sea.

Several endowed lectureships are maintained by the University. The McNair Lectureship, founded in 1906 by the will of John Calvin McNair of the class of 1849, provides for an annual series of lectures by visiting scholars of distinction, and for the publication of the lectures in book form. The Weil lectures in American Citizenship, founded by Mr. Sol Weil and Mr. Henry Weil, of Goldsboro, were inaugurated by former President William Howard Taft in 1914-1915.

In addition to these special courses and lectureships, there is a student lecture course which provides each year many single lectures by well-known people. Some of these are of scholarly nature, others are popular. There are many entertainments of various kinds under the direction of the University. Notable among these are the Sunday afternoon recitals conducted by the Department of Music, the concerts and recitals by various University musical organizations, and the productions of dramatic work by The Caro-

lina Playmakers. These plays are written by students in English 31 and are produced by them, under the direction of Professor F. H. Koch, at The Playmakers Theatre.

In the various departmental clubs students engaged in work in special fields find opportunity for the discussion of problems of mutual interest. The Graduate Club, an organization directed and controlled by the graduate students for the purpose of discussion of common interests, meets monthly and affords an opportunity for social intercourse and the development of an *esprit de corps* among graduate students. All graduate students are eligible for membership.

# ORGANIZATION OF THE GRADUATE SCHOOL

Work for advanced degrees in the University of North Carolina is under the supervision of the graduate faculty, which consists of those officers of professorial rank who are chiefly interested in the Graduate School, either because they offer courses for graduate students or because of their interest in research. The immediate direction of the Graduate School is in charge of an administrative board, of which the Dean is chairman, consisting of ten members of the faculty who represent the three divisions under which the courses offered by the graduate faculty are listed.

These divisions, with the departments constituting each, are as follows:

I. *The Division of Languages and Literatures*
- The Department of Classical Languages and Literatures
- The Department of Comparative Literature
- The Department of English
- The Department of Germanic Languages
- The Department of Romance Languages

II. *The Division of Philosophy and of Political and Social Sciences*
- The Department of Economics and Commerce
- The Department of Rural Social-Economics
- The Department of Education
- The Department of History and Government
- The Department of Philosophy
- The Department of Sociology and Public Welfare

III. *The Division of Mathematics and the Sciences*
- The Department of Botany
- The Department of Chemistry
- The Department of Civil Engineering
- The Department of Electrical Engineering
- The Department of Geology
- The Department of Mathematics
- The Department of Physics
- The Department of Psychology
- The Department of Zoölogy

## ADMISSION AND OTHER INFORMATION

### Admission

Holders of bachelor's or master's degrees from approved colleges are admitted to the Graduate School upon presentation of their credentials and without examination. If the institution from which the candidate comes is a member of the Association of American Universities or is recognized on the approved list issued by that Association, no special conditions are imposed, except that the undergraduate record must show the creditable completion of an

amount of work in the special field in which the student proposes to continue his work sufficient to constitute an undergraduate major. In case of insufficient preparation, or of transfer to a different department, certain prerequisite courses may be prescribed which do not carry graduate credit.

Students holding degrees from institutions not included in the membership of the Association of American Universities or its accredited list may be admitted, provisionally, as special students. Such students may qualify as candidates for higher degrees, with the approval of the department and the administrative board, on the satisfactory completion of whatever prerequisite or additional work may be assigned, and after demonstrating, through records in graduate courses taken in one or more quarters of residence in the Graduate School, that they are qualified to do advanced work.

Credit for graduate work, not to exceed two full courses, may be transferred to the University of North Carolina from institutions recognized by the Association of American Universities. Such transfer must be recommended by the head of the department in which the student does his major work and is subject to the approval of the administrative board.

Formal application for admission to candidacy for an advanced degree is required of all regular students. This application may not be filed earlier than the first week of the second quarter of residence. The application must be accompanied by a transcript of the applicant's undergraduate record, except in the case of students who are graduates of this institution. It must be approved, in candidacy for a master's degree, at least five months before the degree is conferred, and in the case of the doctorate at least one year in advance. Approval of the application is dependent on the previous work of the student as shown by his undergraduate record; on the record made in the Graduate School prior to the time when the application is filed; on the certification, by the major department, that the student is qualified to continue advanced work, with a program of work prepared in satisfaction of the requirements for the degree; on the presentation of certificates of proficiency in the foreign languages required for the degree; and on the removal of any special conditions imposed by the department or by the administrative board.

It should be noted that this distinction between admission to the Graduate School and admission to candidacy for a degree does not necessarily involve any extension of the time required for the degree. Properly qualified students will register at once, with the approval of the departments interested, for such advanced courses as they wish to take, and all advanced courses completed according to the rules for graduate work will be credited toward the degree.

## Fees and Expenses

The tuition in the Graduate School is $25.00 for North Carolina students and $33.33 for out-of-state students each quarter. Additional incidental fees, not including laboratory fees, amount to $22.17 a quarter.

## Fellowships and Other Aids

Twenty-four University fellowships, each with a stipend of $500, are available to graduate students. These fellowships carry free tuition (not including laboratory fees), and are payable in nine monthly installments, beginning in October of the year for which they are awarded. Holders of these fellowships are expected to perform certain limited services as teachers or laboratory assistants in the department to which they are assigned. This department must be the major department of graduate study, and each holder of a fellowship will be required to pursue advanced courses in the department during his term as fellow.

Fellowships are awarded only to those who present satisfactory records as students and who give promise of being able to carry on advanced work with distinction. Teaching experience is desirable, but is not required.

Fellows are not permitted to hold any other office or position connected with the University, and they may not occupy any position outside the University during the term of the fellowship, or engage in any work for pay without the written permission of the Dean.

Correspondence in regard to the teaching fellowships may be addressed to the Dean or to the head of the department in which the candidate proposes to do his major work. A special form of application, to be secured from the Dean's office, must be filed before March 15. Elections to fellowships will be made by the administrative board of the Graduate School, on nomination by the department to which the fellowship is to be assigned. Since the University is a member of the Association of American Universities, the rules of that Association in regard to fellowships are followed.

Fifteen University scholarships are available to both men and women on the same general terms as those governing the fellowships. These scholarships carry remission of tuition fees, and require no services. They are open to candidates in any department represented in the Graduate School.

A limited number of appointments as teaching assistants are also available. The stipend ranges from $500 to $800, and tuition fees are remitted. They require approximately half-time teaching, the remainder of the time being devoted to advanced study in the

department in which the appointment is held. Application for assistantships should be made to the head of the department concerned.

### Fellowships in Engineering

Through the coöperation of the Water Resources Division of the North Carolina Department of Conservation and Development, a fellowship is offered annually for research work in water resources, with particular reference to hydrology. From time to time other fellowships are given by municipalities and industries for the prosecution of special research studies and investigations. Applications for these fellowships should be made to the dean of the School of Engineering.

### The Research Prizes

A prize of fifty dollars is offered each year for outstanding research done by graduate students in each of the three major fields of graduate study: Languages and Literature, Pure Sciences, and History and Social Sciences. The administrative board of the Graduate School reserves the right to withhold any or all of these prizes if, in its judgment, no outstanding work has been done.

### Institute for Research in Social Science

The increasing emphasis placed upon the social sciences within recent years and the need for scientific research in this field have given rise to a number of organizations for promoting research. Among these are such organizations as The Social Science Research Council and several of the national foundations which have set aside major portions of their funds for this purpose. In history, government, economics, sociology, jurisprudence, anthropology, statistics, social psychology, and other related fields, there is need for new standards of research, for coördination, and for correlation.

At the University of North Carolina there was for some time special need for assistance if the many investigations in the social sciences, already under way or projected, were to be carried out.

It was a fortunate circumstance, therefore, when the Laura Spelman Rockefeller Memorial in 1924 made a first grant of $97,500 to the University of North Carolina, to be used over a period of three years, and in 1927 a second grant for $240,000, covering a five-year period, for the study of problems in the social sciences arising out of state and regional conditions. For the administration and expenditure of these funds, the President of the University set up an Institute for Research in Social Science, the main purpose of which was to assist faculty members in the prosecution of their research by means of research assistants, field expenses, and clerical help. Research professors and associates who by training and experience are well qualified to direct research in the particular

fields to which they have been assigned, and research assistants with graduate training, are now the chief agents for carrying on the work of the Institute. Eight or ten research assistants are appointed each year on a twelve months' basis with an annual stipend of $1,500. Each appointment is made with the definite purpose in mind of assisting with a specific piece of research. A graduate degree or a year's graduate work with research experience is a prerequisite for appointment to an assistantship. While assistants may, under certain conditions, become candidates for the doctor's degree, research is the primary aim of these grants.

The work of the Institute represents a specific program of regional social research, study, and interpretation. In both content and method it will undertake to cover a wide range of study and interpretation of regional problems and culture patterns, as well as to present its problem-study results and occasional volumes in method, principles, and social practice, in so far as they are related to the promotion of the social sciences. The selection and prosecution of regional studies in general are made the joint basis of the availability and timeliness of the particular problem and its original contribution to the larger field of the social sciences.

The work of the Institute is facilitated through the central office with stenographic assistance, a central work room with desks and equipment, statistical helps, and library assistance. Institute seminars for the joint consideration of problems and projects, and conferences and discussions by visiting experts in the several fields in the social sciences have been established.

## Rooms and Board

The Smith Dormitory has been entirely remodeled and provides living quarters and club rooms for fifty-one male graduate students. A dining room is operated in connection with it. Women students are accommodated in Spencer Hall, which also provides dining facilities. The rates per month are as follows:

| | Single Room | Double Room | Board |
|---|---|---|---|
| Smith Dormitory ..... | $18.00—$25.00 | $12.50 | $30.00 |
| Spencer Hall..... | $20.00 | $12.50 | $30.00 |

Rooms are also available in town. Board costs from $22.00 to $35.00 per month.

## The University Year

Four terms, or quarters, of approximately eleven weeks each, constitute the regular University year. In all of these terms graduate courses are offered, and students may register at the beginning of any term. The summer quarter is a component part of the University year, and the rules for admission and the require-

ments for advanced degrees are the same as in other quarters. The master's degree may ordinarily be attained in three summer quarters or an equivalent.

The unit of work is the course, by which is meant, as a rule, a class meeting five times a week. Half courses are also offered. In some courses open only to graduate students, such as the seminars and other research courses, the formal class exercises are modified. But all such work is credited in terms of courses and half courses.

Not more than three courses, or fifteen hours of class attendance, will be permitted. Students of more than one year's standing, candidates for the doctor's degree, are permitted greater latitude with reference to courses for which formal registration is required. Such considerations as the amount of time devoted to research, to work on the doctoral dissertation, and the like, weigh in the estimate of what constitutes full work. But in all such cases detailed reports by the department are required before residence credit is given.

Only work announced as open for graduate credit in this bulletin or the bulletin of the summer school session may be counted toward the higher degrees.

Work done *in absentia* will not be counted for graduate credit, except that in certain cases approved by the department and by the administrative board part of the work on the thesis for a higher degree may be done elsewhere, and except, further, that part of the work required for the degree of doctor of philosophy may, on recommendation of the major department and with the approval of the administrative board, be done at another university. But all such work, even when credited, is subject to examination at the finals required for the degree.

## General Regulations

The following regulations of the graduate faculty should be observed:

1. Graduate students are subject to the same rules regarding attendance upon classes, faithfulness to assigned tasks, examination and credit, as students in other departments of the University. But graduate work pre-supposes a greater amount of time for research in the library or the laboratory; and the student, being more mature, is thrown more upon his own responsibility. For these reasons excessive registration is not permitted. The whole idea of graduate work is comprised in a more intense specialization and therefore more complete investigation than is necessary or wise in undergraduate instruction. The administrative board will not count for credit toward a higher degree work done by students who, in the same session, are doing work toward a higher degree in any other graduate or professional school.

2. Grades for each course completed are reported to the Dean and to the Registrar. These grades are as follows:

"High," which represents work of distinction.

"Passed," which represents satisfactory work.

"Failed," which represents work that is unsatisfactory for graduate credit.

No work falling below the standard represented by the grade of "Passed" is counted for graduate credit. If, in the judgment of the administrative board, the quality of the work done by any student falls below the standard expected of graduate students, the registration of such a student will be canceled.

3. Work taken more than ten years before the date at which a degree is expected may not be used to count for credit toward that degree.

4. Each graduate student works under the direction of a special committee, which consists usually of the head of the major department or of some member of the staff of that department under whom the candidate is doing special work, who serves as chairman, and the other instructors with whom the candidate is registered. The program and plan of study proposed by each graduate student will be approved by the chairman and by the Dean.

The effort is made to arouse in the mind of the student a feeling that graduate work is not a matter solely of attendance on classes and passing examinations on courses. He must see his work as a whole and in its relation to a department of learning, not as a set of isolated units. In the more intimate personal relations to the advisory committee, too, he finds values impossible in the undergraduate course. He is a member of a small group; instruction is more nearly personal; he becomes acquainted with the method as well as with the content of learning.

# THE GRADUATE DEGREES

The degrees under the supervision of the graduate faculty are Master of Arts (A.M.), Master of Science (S.M.), and Doctor of Philosophy (Ph.D.).

## 1. THE DEGREE OF MASTER OF ARTS

### Prerequisites

For the degree of master of arts the general prerequisite is the completion of a course leading to the degree of bachelor of arts or occasionally the degree of bachelor of science in a college or university of standard grade. This course should have included special study in the department in which the graduate degree is sought sufficient in extent to constitute, in the judgment of the department, a proper preparation for the advanced work expected of candidates for the degree. If the undergraduate preparation has been insufficient, departments may prescribe certain preliminary courses before recommending a student for admission to candidacy for a higher degree. Such courses do not count for graduate credit, but become requirements for the degrees in addition to the nine courses specified below.

### Registration

Nine full courses of advanced character are required for the master's degree. To complete these courses at least three full quarters of residence are required. No course will be counted for the degree unless it appears in this bulletin or is approved by the administrative board for inclusion in the next catalogue of the Graduate School. Such courses are of two classes only: those primarily for graduates, and those open to graduates and advanced undergraduates. Courses of this second class are ordinarily open only to students of at least senior standing.

### Courses of Study

Of the nine courses offered by candidates for the degree of Master of Arts, six shall constitute the major and three the minor. These courses will be selected by the chairmen of departmental committees on graduate studies or by the student's special advisory committee, subject to the approval of the administrative board. The courses, both major and minor, may be chosen from a single department or from more than one, the decision being determined by what appear to be the interests of the student. The aim, however, will be to provide the student with a program of studies having a clearly defined relationship.

### Other Requirements

The method of securing admission to candidacy for the degree and the relation of the candidate to his advisory committee are explained above under the heading of General Regulations.

A reading knowledge of at least one modern foreign language is expected of candidates for the master's degree. In case the department of major interest is not satisfied with the evidence submitted, this knowledge will be tested by a special examination given by the language department, and must be certified to before the student is admitted to candidacy for the degree.

### The Master's Thesis

Besides the completion of advanced courses that constitute a unified plan of study, the fitness of the student for the degree is tested in two ways: by a thesis and by oral and written final examinations. The thesis tests the candidate's knowledge of the method of investigation and his ability to make use of the knowledge he has acquired. The examinations test his knowledge of his special field by directing attention to the field as a whole, as contrasted with the course, which deals with a limited portion of the field.

The subject chosen for the thesis must be approved by the advisory committee and reported to the administrative board by the beginning of the second quarter of residence. No change in subject, or deferring of the time of approval, will be permitted unless at least two quarters of residence intervene between the approval of the subject and the conferring of the degree, except that, with the permission of the administrative board, the thesis may be completed by a student not in residence who has satisfied the requirements as to courses. For a statement of the conditions under which such permission may be secured, see above under the heading General Regulations.

The subject of the thesis must be connected with the major, must be connected with a course or courses pursued in residence, and may count not to exceed one course. In case the courses offered by the candidate include a seminar, the purpose of which is to give aid in the preparation of the thesis, no credit will be given for the thesis *per se*. The thesis, in order to be approved, must be written in correct English and in scholarly form. It must show independent thought both in its recognition of a clearly defined problem and its method of treatment. It must show the sources of information and a knowledge of the bibliography of the special field.

The thesis must be presented at least one month before the commencement at which the degree is to be conferred, and in duplicate.

The first copy must be on paper of prescribed size and quality, and must observe the special rules of form established by the administrative board. A copy of the regulations for the form of theses and abstracts may be had on application to the Dean's office. An abstract must be submitted with the thesis; if the thesis is approved and the degree conferred, this abstract will be printed in a special bulletin of the Graduate School annually devoted to reports of research.

### Examinations

Candidates for the master's degree are required to pass all examinations in courses at the end of each quarter of residence, with the grades specified under the general regulations above. In addition, two special examinations are required. The first of these, a written examination on the field of the major, is to be set by the student's advisory committee, and must be taken not earlier than the first month of the last quarter of residence. The second examination is oral, covering the entire work of the candidate, both major and minor, with special stress on the thesis and one other topic to be selected by the candidate. The examination is to be conducted by a special committee appointed by the Dean, consisting as a rule of the student's adviser as chairman and at least two other representatives of the major and minor subjects. Formal notice of the time and place for holding this oral examination shall be sent to all officers of professorial rank in the major and minor departments and to the members of the administrative board, and persons so notified may attend the examinations if they so desire.

These examinations must satisfy the committee which has charge of them that the candidate possesses such knowledge of his major and minor field as may reasonably be expected, that he can draw upon his knowledge with promptness and accuracy, and that his thinking is not limited to the separate units represented by his courses. Ability to draw conclusions and to express ideas with clearness and precision is a necessary element. No mere memorizing of facts will serve.

The special committees on theses and on the examinations will report their recommendations to the Dean at least one week before the end of the last quarter of residence. If the candidate's record in these respects is satisfactory, and if he has complied with all of the requirements for the degree, the Dean will report to the faculty for approval and recommendation to the board of trustees.

### Commencement

Degrees are conferred at the annual commencement exercises of the University in June and at the close of the summer quarter in August. But a candidate may complete his required work, includ-

ing examination and submission and acceptance of the thesis, at the end of any quarter or term. A student must be registered in the University in the quarter in which he is to be awarded a degree. If his work has been completed before this time, this requirement may be met by filling out the registration blanks without registering for specific courses. Attendance at the commencement at which the degree is conferred is required unless the candidate is specially excused by the Dean and the President of the University.

### Summary of the Province of the Degree of Master of Arts

The rules and conditions governing the degree of master of arts set forth in the preceding paragraphs have certain well defined aims. It is not a research degree in the sense that the candidate is required to make a contribution to knowledge. It is, however, a research degree so far as the individual student is concerned, since he is engaged in a more detailed study of a single field of learning than was possible during his undergraduate course and this detailed study culminates in work upon a single problem, the subject of his thesis, for the solution of which he is required to give attention to the method of advanced study. He is concerned with the materials of learning, and with the organization and interpretation of these materials. The purpose of his study is still liberal, as in the undergraduate course, but he seeks freedom, not in brief and often unrelated sections taken from the entire field of learning, but in more intensive study of a single province. To this end, of securing freedom and liberal training along with the greater confidence that is to be gained only through mastery of a sharply defined field, the greatest possible latitude is permitted in study plans. The object is not to train specialists but to gain a relative mastery of one of the liberal arts. Hence the correlation of courses, the oral and written examinations, and the thesis. Since there are many possible combinations of courses, and since the method of administration provides for personal supervision of a student's work by a special committee, the training for the degree is a useful and needed supplement to the undergraduate course.

The work outlined above can be done in one year by students whose preparation has been good and who devote themselves as fully to this more specialized work as they would in a professional school. But two years are better than one, and will yield correspondingly greater results. Especially is this true for young men and women who deside to prepare for high school and college teaching, but who do not wish to become investigators or specialists. Part of their time may be spent in a study of courses and programs, and of methods of instruction applicable to their special subjects. Two years of study of this sort, if put on the right foundation, will give rich results, and for some reasons such a

course is more useful than the course which leads to the doctorate. The administrative board will gladly plan work for the degree of master of arts on a two-year basis, and persons who complete such a course with distinction will be specially recommended for teaching positions of the better grade.

Teaching fellows, assistants, and instructors whose time is partly devoted to service to the University will be expected to take more than one year to obtain the master's degree. Such students will not be permitted to carry for credit in the Graduate School more than six courses in any one academic year.

### 2. THE DEGREE OF MASTER OF SCIENCE

#### Prerequisites

The subjects of major study may be chemistry, civil engineering, commerce, electrical engineering, or geology, and the prerequisite courses are the courses leading to the following degrees: B.S. in Chemistry, B.S. in Civil Engineering, B.S. in Commerce, B.S. in Electrical Engineering, and B.S. in Geology. Before becoming a candidate for the advanced degree the student must complete the courses leading to the corresponding bachelor's degree as outlined in the general catalogue.

#### Courses Leading to the Degree of Master of Science

I. Master of Science in Chemistry

One of the groups:
- Chemistry 111 a-b-c
- Chemistry 121 a-b-c
- Chemistry 141 a-b-c
- Chemistry 161 a-b-c
- Chemistry 181 a-b-c

One of the groups:
- Chemistry 112 a-b-c
- Chemistry 122 a-b-c
- Chemistry 142 a-b-c
- Chemistry 162 a-b-c
- Chemistry 182 a-b-c
- Chemistry 183 a-b-c
- Chemistry 184 a-b-c

One and one-half courses in Chemistry, approved by the head of the Department of Chemistry.

Three approved courses from one of the following departments:
- Electrical Engineering
- Geology
- Mathematics
- Civil Engineering
- Zoölogy

II. Master of Science in Civil Engineering

A. Municipal and Sanitary Engineering

Majors
- Advanced Sanitary Engineering, 130 a-b-c
- Research in Hydraulic and Sanitary Engineering 131 a-b-c
- Hydrology, Engineering 132 a

Sanitary Chemistry and Biology, Engineering 133 a-b-c
Vital Statistics, Engineering 135 a
Minors
Water Power Engineering 134 b-c
Contracts and Specifications, Engineering 100 a-b-c
Bacteriology
Zoölogy
Chemistry
Commerce

B. Highway Engineering
Majors
Detailed Laboratory Study of Highway Materials, Engineering 145 a-b-c
Contracts and Specifications, Engineering 100 a-b-c
Research in Highway Engineering, Engineering 140 a-b-c
(This course is open to research fellows only and will be substituted by them for Engineering 145 a-b-c
Minors
Electrical Engineering
Advanced Steel Structures, Engineering 114 a-b-c
Advanced Reinforced Concrete Structures, Engineering 124 a-b-c
Commerce
Geology

C. Structural Engineering
Majors
Advanced Steel Structures, Engineering 114 a-b-c
Advanced Strength of Materials, Engineering 105 a-b-c
Reinforced Concrete Structures, Engineering 124 a-b-c
Contracts and Specifications, Engineering 100 a-b-c
Minors
Electrical Engineering
Mechanical Engineering
Geology
Commerce
Other approved courses in the following departments may be selected:
Civil Engineering, Mechanical and Electrical Engineering, Chemistry, Geology, Mathematics, Physics, and Commerce.

D. Hydro-Electric Engineering.
Majors
Water Power Engineering, Engineering 134 b-c
Electric Transients, Engineering 164 a
Hyperbolic Functions Applied to Transmission Problems, Engineering 164 b
Design of Transmission Systems, Engineering 164 c
Electrical Engineering Research and Design, Engineering 184 a-b-c
Research in Hydraulic and Sanitary Engineering, Engineering 131 a-b-c
Contracts and Specifications, Engineering 100 a-b-c
Minors
Hydrology, Engineering 34 a
Power Plant Design and Operation, Engineering 95 b-c
Alternating Current Machinery and Power Transmission, Engineering 64 a-b-c
Electric Circuits, Engineering 85 a

III. MASTER OF SCIENCE IN COMMERCE

Courses to be arranged in consultation with the head of the Department of Commerce.

IV. MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

Electrical Engineering 164 a-b-c
Electrical Engineering 184 a-b-c
Three approved courses from one of the following departments:
Civil Engineering
Chemistry
Mathematics
Physics

V. MASTER OF SCIENCE IN GEOLOGY

Geology 104-105-106
Geology 107-108-109
Three approved courses from one of the following departments:
Chemistry
Physics
Civil Engineering
Botany and Zoölogy

VI. MASTER OF SCIENCE

Students holding the degree of B.S. from a standard college may proceed to the degree of S.M. by fulfilling the following requirements: six approved courses in some science (the major), three courses in an allied department (the minor).

### Other Requirements

The requirements regarding modern language, thesis, examinations, committee, residence, and conferring of degrees are the same as for the degree of master of arts.

### 3. THE DEGREE OF DOCTOR OF PHILOSOPHY

The degree of doctor of philosophy is conferred only upon those who have completed, with high distinction, a period of extended study and investigation in a single field of learning during which they have gained control of the materials in the chosen field, have mastered the method of advanced study, and have illustrated this method through a dissertation, the result of independent research, which adds to the sum of human knowledge or presents results that have enduring value. Neither the accumulation of facts, however great in amount, nor the completion of advanced courses, however numerous, can be substituted for this power of independent investigation and the proofs of its possession. While it is true that a well prepared student of good ability may secure the degree upon the completion of three years' study, it should be understood that this time requirement is wholly secondary to other considerations that will be explained in the following paragraphs. In some instances work done in other institutions may be counted toward the degree at the discretion of the committee in charge and the administrative board (See page 21.) Under no circumstances

will the degree be awarded until the student has been in residence at least three consecutive quarters within a period of twelve months.

### Admission

The rules for admission to courses leading to the degree of doctor of philosophy and for registration for courses in the first year of residence are the same as those stated above in the section on the degree of master of arts. (See page 27.)

### Course of Study

Not later than the beginning of the second year's work a tentative program of study must be approved by the special committee and by the administrative board. The choice of major and minor subjects and the selection of courses will be made upon advice of the student's special committee, subject to the approval of the administrative board. Such committees will be guided by the following principles: 1. There shall be a major in some well defined and recognized field, a mastery of which must be the aim of the student. As he will be held responsible for the whole field, he may be required to take as many courses as may de designated by the department concerned. In cases wherein it appears advisable departments may impose additional requirements. 2. There shall be a minor, consisting of six courses, selected by the student's special committee. These courses may or may not be drawn from those offered by the department of the major, but must follow a consistent plan.

The work of the third year, or of such additional years as may be necessary, is primarily concerned with the writing of the dissertation or with special laboratory or research work. The department of the major or the student's special committee, however, may exercise the discretionary power of requiring that certain additional courses be taken.

### Foreign Language Requirements

Each candidate must pass examinations in French and German given under the supervision of the foreign language departments. These examinations will include one general elementary passage of French and of German, and at least two other passages in each language chosen from the field of specialization. The foreign language departments will set three dates each year, one about November 15, one about March 15, and one about July 20, for these examinations.

### The Dissertation

The subject chosen for the dissertation must be approved by the committee and by the administrative board not later than the time

of the preliminary examinations. But work upon it, such as preliminary bibliographies and the collection of material, should be begun earlier than this. The dissertation is the fruit of thorough investigation of a definite problem and finds its value in the scholarly and workmanlike manner in which it is presented, in its contribution to learning, and in the mental power which it displays.

The dissertation must be presented, in three typewritten copies, at least six weeks before the commencement at which the candidate expects his degree. It must comply with the rules for form of thesis prescribed by the administrative board, and abstracts must be supplied as under the rules for the master's thesis. A thesis committee, appointed by the Dean, shall examine the dissertation, and no dissertation shall be accepted unless it secures the unanimous vote of the committee.

Publication of the dissertation, except by abstract in the graduate bulletin, is not required. But the various journals published by the University afford opportunity for publication at least in part, and such publication is expected.

### Examinations

Not earlier than the end of the second year, and at least one academic year prior to the commencement at which the degree is expected, a preliminary oral examination shall be given by the special advisory committee in charge of the candidate's work and by all members of the staff of the major and minor departments. This examination shall cover all the work of the two years. No student will be admitted to candidacy for the doctorate until this examination has been passed.

At least four weeks before the end of the period of study a written examination must be passed by the candidate. The field to be covered by this examination shall be determined by the student's special committee.

The final oral examination must take place at least one week before the commencement at which the student is a candidate for the degree. In case the department so desires, the student may undertake the oral in the major and the minor subjects separately. In no case, however, may a greater time than three months elapse between the two examinations. The committee to have charge of this examination is appointed by the Dean, and includes the head of the major department or his representative as chairman, with other members of the major and minor departments as assistants. The date and place of the examination shall be publicly announced, and the examination shall be open to any member of the graduate faculty.

Candidates whose record in courses, examinations, and dissertation is satisfactory will be reported by the Dean to the faculty for recommendation to the board of trustees.

### Commencement

Attendance at the commencement at which the degree is conferred is required, unless the candidate is excused by the Dean and the President of the University. (See also pages 30-31.)

## SUMMARY OF THE REQUIREMENTS FOR HIGHER DEGREES

### Master's Degree

1. A bachelor's degree from a recognized institution.
2. A minimum residence period of three quarters.
3. Certification of proficiency in one modern foreign language.
4. Nine graduate courses, six of which must be in the department of the major.
5. A written examination in the field of the major.
6. An oral examination covering the entire field of study.
7. A thesis.

### Doctor of Philosophy

1. Admission is the same as for the master's degree.
2. A minimum of three years of graduate study, at least one of which must be at the University of North Carolina.
3. A reading knowledge of French and German.
4. A major covering adequately the field of major interest and at least six courses in a minor, which may or may not be in a different department.
5. A preliminary oral examination.
6. A written examination in the field of major interest.
7. An oral examination covering the entire field of study.
8. A dissertation.

# COURSES OF INSTRUCTION

Only those members of the various departmental staffs who are concerned in graduate instruction are included in the following statements.

## NOTES ON THE METHOD OF NUMBERING AND COUNTING COURSES

A *course* meets five or six times a week; a *half-course* meets three times a week. Two hours of laboratory or field work count as one meeting. All work is credited toward degrees either as whole or as half courses in accordance with the principles stated above.

Courses with a double number are completed in two quarters, and in general credit will not be given until both quarters have been completed.

Courses with three numbers require three quarters to complete, and in general credit will not be given for the work of one or two quarters only.

The letters *a, b,* and *c* refer to the quarter in which a course is offered, as *fall, winter,* and *spring,* respectively.

## DEPARTMENT OF BOTANY

WILLIAM CHAMBERS COKER, Professor.

HENRY ROLAND TOTTEN, JOHN NATHANIEL COUCH, Associate Professors.

For students well prepared in botany, opportunities are open in teaching, in the scientific work of the United States government and of state institutions, in special work in various phases of the subject, such as plant breeding, and with independent institutions. A master's degree in botany should prepare the student for positions in any of these fields. A doctor's degree is open to those who have the opportunity to prepare themselves for the more responsible positions. One teaching fellowship of $500 and two assistantships are open to students prepared to fill them.

### Laboratory Equipment

The botanical department has recently moved into a new, well equipped, fireproof building which was added as an extension to the older building previously occupied by both the zoölogical and botanical departments.

The laboratory facilities are fully up to the standard of similar institutions, and funds are available for the purchase of any additional laboratory apparatus needed by research students in special subjects. Included in the equipment is a greenhouse, 15 feet wide by 80 feet long, which is a great aid in the production of plants for class use and for special research.

The department is prepared to guide students in research, particularly along the following lines: taxonomy and morphology of the lower plants, excluding bacteria; morphology and cytology of any group of plants except bacteria; and the constitution and distribution of the flora of North Carolina.

The library of the department has in the last few years been greatly augmented along the lines of standard classical works of prime importance in research, particularly in the field of mycology. In this field the department

library is more complete than that of any other southern institution. Particular attention has also been given to American publications in botany of historical importance. It contains a majority of the important botanical journals as well as thousands of valuable books and reprints. The Arboretum is of much value to students in the study of special problems, and the surrounding country is particularly rich in a great variety of interesting plant life.

The candidate for the master's degree is at first given work requiring individual initiative, and a part of his work during the course consists of original work, with the preparation of his results in the form of a thesis suitable for publication. Reading knowledge of French or German is required.

Candidates for the degree of doctor of philosophy give most of their attention to the preparation of an advanced thesis and must show ability to handle their subject in an original manner. A part of their work must be done during the summer at biological stations or other institutions, and visits to other libraries may be necessitated for the study of special literature.

### Courses for Graduates and Advanced Undergraduates

4, 5, 6. STRUCTURE AND DEVELOPMENT OF THE FUNGI. Prerequisite, Botany 1.

A study of the morphology of the fungi with special attention to plant diseases, to the culture and development of the lower fungi, and to the identification of mushrooms. Lectures and laboratory and field work. These courses may be continued under the same numbers for more than one year as the subject advances, credit being given for each repetition. *One lecture and eight laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $4.00 a quarter.* Professors Coker, Couch.

8. SEMINAR, STUDIES IN THE HISTORY OF BOTANY. Prerequisite, two courses in botany.

Readings and reports. This course may be continued for more than one year as the subject advances, credit being given for each repetition. *Three hours a week, winter quarter.* Professor Coker.

Botany 21-22. STRUCTURE, GROWTH, AND CLASSIFICATION OF LIVERWORTS AND MOSSES. Prerequisite, Botany 1.

*Two lectures and six laboratory hours a week, winter and spring quarters. Laboratory fee, $4.00.* Professors Coker, Couch.

Botany 23. STRUCTURE, GROWTH, AND CLASSIFICATION OF FERNS. Prerequisite, Botany 21-22.

*Two lectures and six laboratory hours a week, fall quarter. Laboratory fee, $4.00.* Professors Coker, Couch.

### Courses Primarily for Graduates

107-108-109. PLANT MORPHOLOGY.

Advanced work in the embryology and anatomy of plants. The student is required to collect and prepare material for the microscopic study of special problems. Theses. These courses may be continued under the same numbers for more than one year as the subject advances, credit being given for each repetition. *Ten laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $4.00 a quarter.* Professor Coker.

110-111-112. GRADUATE RESEARCH.

Original work, with thesis, under the guidance of the instructor. This course may cover most of the work of the student for several years, credit being given each year in accordance with the work done. *Laboratory fee, $4.00 a quarter.* Professor Coker.

## DEPARTMENT OF CHEMISTRY

JAMES MUNSIE BELL, FRANCIS PRESTON VENABLE, ALVIN SAWYER WHEELER, FRANK KENNETH CAMERON, FRANK CARL VILBRANDT, Professors.
JAMES TALMAGE DOBBINS, FLOYD HARRIS EDMISTER, Associate Professors.
HORACE DOWNS CROCKFORD, RALPH WALTON BOST, Assistant Professors.

The student who wishes to make chemistry his profession may later wish to enter one of the following branches of the profession: (1) *Teaching in schools, colleges, and universities.* At present the work leading to the degree of S.B. in Chemistry fulfills the requirements of the state, but there is a strong tendency towards the requirement of the master's degree for the highest grade of teacher's certificate. For teachers in colleges and universities the work leading to the Ph.D. degree should be taken. (2) *For industrial chemists, consulting chemists, and chemical experts,* at least the S.M. degree and preferably the Ph.D. should be sought. The courses leading to these degrees provide also thorough training in the allied sciences: physics, geology, mathematics, and engineering, thus enabling the student to become an expert adviser for a corporation in developing and supervising its manufacturing plants, or to act as a consulting chemist in special problems. (3) *The national and state scientific bureaus* employ large numbers of chemists and are constantly appealing to the universities for nominations to fill new positions. The better of these positions require candidates with the Ph.D. degree. (4) *Research chemists* are employed by many private manufacturing establishments and by many semi-public research organizations which maintain thoroughly equipped laboratories. In these, investigations are pursued that have for their end the improvement of old methods and the invention of new methods. The number of such laboratories is rapidly increasing and there is now a great demand for highly trained chemists to take charge of these laboratories and to direct their work. The proper training for such a career is the work leading to the Ph.D. degree.

The work of a graduate student who specializes in chemistry consists in large measure in the solution of some research problem. The student learns at first hand the point of view and the methods of research chemists. At the present time a number of lines of investigation are being actively followed in this laboratory. In inorganic chemistry research is in progress on certain of the rare earths. Several problems in heterogeneous equilibria are being carried on by the divisions of Physical, Analytical, and Inorganic Chemistry. In physical chemistry the physical constants of the nitrotoluenes are being investigated at the request of the National Research Council. Oxidation-reduction studies and studies bearing on the theory of solutions are also being carried on by the Division of Physical Chemistry. In organic chemistry cymene, a by-product of wood-pulp manufacture, is being investigated. Work is also progressing on juglone and on naphthazarine, two dye intermediates, on condensation reactions between diketones and semicarbazide and phenylsemicarbazide, and on extension of the Grignard Reaction. The reactions of the lead and tin organo-metallic compounds and the aromatic carbithioic acids are also under investigation. In industrial chemistry there is research on problems connected with the refining of petroleum and its by-products, on the by-producting of coal of the Deep River coal field, on lubricating oils and motor spirits, on industrial hydrogenation, on regenerated and converted cellulose, on cottonseed oil, on fish oil, and on several unit operation problems in Chemical Engineering. In analytical chemistry a study of the separation of the anions is being carried on. The results of all these researches appear as the work proceeds, and during recent years numerous articles reporting progress in these investigations have been published in American journals.

The research experience gained in the graduate years is of inestimable value not only to the student himself but also to the educational institution or to the industry with which he later becomes associated. This is amply verified

from the records of the positions held by the graduates of the University. Many have gone into the iron and steel industry, a number into the dye industry either as supervisors of plant operation or as directors of chemical research. Others have gone into other industries, such as tobacco, corn products, general chemicals, and fertilizers. Several alumni are now in charge of large research projects at public and semi-public institutions.

The Department of Chemistry now occupies a new building named Venable Hall of Chemistry in honor of Doctor Francis P. Venable, who has been connected with the Department for forty-nine years. This building has about 55,000 square feet of floor space, mostly of modern factory construction, which with sky-light illumination is admirably adapted for laboratory use. The structure is fireproof, and contains a complete modern ventilating system. About thirty small individual research laboratories have been provided for the faculty and for graduate students. Each of these rooms is furnished with hot and cold water, live steam, gas, air under pressure, and electric current for experimental purposes. So far as possible the laboratory furniture is of fireproof construction, the laboratory table tops, hoods, and sinks being constructed of alberene stone or asbestos lumber. The library of the department occupies a large room in the main building and connects with a seminar room where small advanced classes are held.

The chemical library and reading room contain many complete sets of the most important chemical periodicals, many books of reference, and a unique collection of books of historical value and interest, amounting altogether to more than 3,000 volumes. An endowment of $5,000, the generous gift of Mildred Cameron Shepard in memory of her father, Paul Cameron, supplements the general fund for the maintenance of the library.

### Fellowships and Scholarships

*Ledoux Fellowship.* This fellowship, awarded annually, is the gift of Dr. A. R. Ledoux of New York. The amount of the fellowship is $300.

Attention is also called to the teaching fellowships which are open to graduate students who wish to defray part of their expenses by teaching elementary classes.

Some assistantships are also open to graduate students. The duties of the assistants are the preparation for and supervision of laboratory classes in the larger elementary courses and also the examination of laboratory reports.

Applications for these positions should be directed to the Department of Chemistry not later than March 15 of each year.

### Graduate Degrees in Chemistry

The course leading to the degree of S.M. in Chemistry is open to students who have graduated with the degree of S.B. in Chemistry at the University, and to students who have completed the equivalent of the courses as prescribed by the University. The course leading to the degree of S.M. in Chemistry is prescribed by the graduate faculty and consists of a research in one of the branches, inorganic, organic, analytical, industrial, or physical chemistry; of two seminar courses of three quarters each in two of those branches; and of one course of three quarters to be selected from five departments: Physics, Geology, Electrical Engineering, Civil Engineering, and Mathematics. The general regulations of the Graduate School govern the work for the Ph.D. degree.

### Courses of Instruction

For candidates for advanced degrees with a major in some other department and with a minor in chemistry, the following courses only are open. Candidates for the A.M. degree with a major in chemistry must have elected chemistry as a major in the junior and senior years. Prerequisites are therefore: Chemistry 31, 41, 42, 61, 62, and any three of the following: 7, 81, 82, 63, 13, 45, 46.

### Courses for Graduates and Advanced Undergraduates

11, 12. CHEMICAL TECHNOLOGY. Prerequisite, Chemistry 45, 46, 61, 62.

The methods and economics of the chemical industries; lectures and laboratory work. *Three lecture and six laboratory hours a week, fall and winter quarters. Laboratory fee, $7.00 a quarter.* Professor Vilbrandt.

18. HISTORY OF CHEMISTRY. Prerequisite, Chemistry 61, 62, 81, 82.

History of Chemistry, with discussion of the development of chemical theories. *Three hours a week, spring quarter.* Professor Venable.

63. IDENTIFICATION OF PURE ORGANIC COMPOUNDS. Prerequisite, Chemistry 61, 62.

Lectures and laboratory. *Three lecture and six laboratory hours a week, fall quarter. Laboratory fee, $10.00.* Professor Bost.

64. CHEMISTRY OF DYESTUFFS. Prerequisite, Chemistry 61, 62.

Lectures and laboratory. (Given in 1929-1930 and in alternate years.) *Three lecture and four laboratory hours a week, winter quarter. Laboratory fee, $10.00.* Professors Wheeler, Bost.

65. ADVANCED TOPICS IN ORGANIC CHEMISTRY. Prerequisite, Chemistry 61, 62.

Lectures and laboratory. (Given in 1928-1929 and in alternate years.) *Three lectures and four laboratory hours a week, winter quarter. Laboratory fee, $10.00.* Professors Wheeler, Bost.

67, 68. ADVANCED ORGANIC PREPARATIONS. Prerequisite, Chemistry 61, 62.

Laboratory course. *Six laboratory hours a week, winter and spring quarters. Laboratory fee, $10.00 a quarter.* Professors Wheeler, Bost.

83. ADVANCED PHYSICAL CHEMISTRY. Prerequisite, Chemistry 81, 82.

Lectures and textbooks. *Five hours a week, fall winter.* Professor Crockford.

84. ELECTROCHEMISTRY. Prerequisite, Chemistry 81, 82.

Lectures and textbooks. *Five hours a week, winter quarter.* Professor Crockford.

85. ELECTROCHEMISTRY. Prerequisite, Chemistry 84.

Laboratory course in Electrochemistry to follow the lecture course, Chemistry 84. *Six laboratory hours a week, spring quarter. Laboratory fee, $7.00.* Professor Crockford.

### Courses Primarily for Graduates

111abc. RESEARCH IN INDUSTRIAL CHEMISTRY.

This course (or 121abc, 141abc, 161abc, 181abc) is intended for applicants for advanced degrees. Laboratory work with frequent conferences with the professor and reference to the literature relating to the subject of research. The subject of research must be assigned or approved by the professor. This course extends throughout the year. *One lecture and nine laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $10.00 a quarter.* Professor Vilbrandt.

112abc. ADVANCED TECHNICAL CHEMISTRY. Prerequisite, Chemistry 11, 12.

Seminar course: readings and discussions of recent advances in technical chemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professor Vilbrandt.

121abc. RESEARCH IN INORGANIC CHEMISTRY.
The statements made in regard to courses 111abc apply also to this course. *One lecture and nine laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $10.00 a quarter.* Professor Edmister.

122abc. ADVANCED INORGANIC CHEMISTRY. Prerequisite, Chemistry 32.
Seminar course: readings, reports, and discussions of recent advances in organic chemistry. *One lecture and four laboratory hours a week, fall, winter, and spring quarters.* Professor Edmister.

141abc. RESEARCH IN ANALYTICAL CHEMISTRY.
The statements made in regard to course 111abc apply also to this course. *One lecture and nine laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $10.00 a quarter.* Professor Dobbins.

142abc. ADVANCED ANALYTICAL CHEMISTRY. Prerequisite, Chemistry 45, 46.
Seminar course: readings and discussions of recent advances in analytical chemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professor Dobbins.

161abc. RESEARCH IN ORGANIC CHEMISTRY.
The statements made in regard to course 111abc apply also to this course. *One lecture and nine laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $10.00 a quarter.* Professors Wheeler, Bost.

162abc. ADVANCED ORGANIC CHEMISTRY. Prerequisite, Chemistry 63, 64.
Seminar course: readings and discussions of special chapters in organic chemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professors Wheeler, Bost.

181abc. RESEARCH IN PHYSICAL CHEMISTRY.
The statements made in regard to course 111abc apply also to this course. *One lecture and nine laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $10.00 a quarter.* Professors Bell, Cameron, Crockford.

182abc. ADVANCED PHYSICAL CHEMISTRY. Prerequisite, Chemistry 83, 84.
Seminar course, readings and discussions of recent advances in Thermodynamics. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professor Bell.

183abc. ADVANCED PHYSICAL CHEMISTRY. Prerequisite, Chemistry 83, 84.
Seminar course, readings and discussions of recent advances in Electrochemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professor Crockford.

184abc. ADVANCED PHYSICAL CHEMISTRY. Prerequisite, Chemistry 83, 84.
Seminar course, readings and discussions of recent advances in Phase Rule and Colloid Chemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professor Cameron.

## DEPARTMENT OF CIVIL ENGINEERING

GUSTAVE MAURICE BRAUNE, THOMAS FELIX HICKERSON, THORNDIKE SAVILLE, Professors.
HERMAN GLENN BAITY, Associate Professor.
RALPH MCCOY TRIMBLE, Assistant Professor.

The profession of civil engineering offers rich opportunities to men who have the power to apply their technical knowledge and experience to the best advantage. Graduate technical training based upon a broad scientific and cultural foundation becomes a valuable asset to those who would fill the places of leadership in the profession and in the affairs of life.

The Department of Civil Engineering offers courses leading to the degree of Master of Science in Civil Engineering. The requirements for the degree are in general the same as for the degree of Master of Arts and the prescribed courses may be found on pages 31-32. Admission to candidacy for this degree presupposes the completion of the regular four-year course of the University leading to the degree of Bachelor of Science in Civil Engineering. In the case of students from other technical schools of recognized standing certain substitutes may be accepted in lieu of the specific requirements for the bachelor's degree here.

The following specialized courses are offered, leading to Master of Science in Civil Engineering.

MUNICIPAL AND SANITARY ENGINEERING. With the rapid increase in the growth of cities in North Carolina and other southern states, there has come about a wide demand for engineers trained to plan and administer the various technical activities of the modern city; therefore, a fifth-year course has been especially designed as á preparation for the important duties of city manager and city engineer. The four undergraduate years are identical with those in Civil Engineering. Especial attention is called to the description of courses 34 and 44, in which a thorough treatment is given to the fundamental principles underlying the design and operation of streets, water works, and sewerage systems, water and sewage treatment plants, garbage and refuse disposal, and drainage. Approved courses in Commerce present the basic facts in business administration which are required of all engineering administrators.

HIGHWAY ENGINEERING. North Carolina has assumed a position of leadership in road building among the states in the Union, and consequently there is a demand for engineers who are trained as specialists in highway construction. Opportunities for employment are open to men who have specialized in highway work with the State Highway Commission, county highway commissions, various municipalities, and with contractors handling highway work. The closest coöperation exists between the State Highway Commission and the University, and students are brought into contact with the state highway organization. The four undergraduate years are identical with those in the course leading to the B.S. degree in Civil Engineering. In courses 44 and 45, training in the subject of Railway and Highway Engineering is given. Course 14 gives the student a working knowledge of the subject of structural design. Course 24 covers the subject of concrete design. Using these courses as a foundation, the student is required in his fifth year to specialize and to acquire a detailed knowledge of the problems of highway construction.

STRUCTURAL ENGINEERING. Structural Engineering includes the design and construction of all kinds of buildings and bridges; for example, typical structures such as the Woolworth Building, Brooklyn and Hell Gate bridges, the immense Panama Canal lock gates. The structural engineer is called upon as a specialist in almost all branches of engineering, because structures of timber, concrete, or steel are found in the construction of nearly every engineering undertaking.

HYDRO-ELECTRIC ENGINEERING. A course leading to the Degree of Master of Science in Civil, Electrical, or Mechanical Engineering. Problems incident to the rapid increase in the development of the great water powers of the South, with the accompanying complexities of generation, transmission,

and distribution of electric energy, have created a wide demand for engineers especially trained in the field of hydro-electric engineering. This course is particularly designed to meet the needs of students intending to enter the service of the various southern power companies, or for engineers now in practice who desire to return for a year of specialized work or research in some of the problems confronting the hydro-electric industry. The four undergraduate years are identical with those in either Civil, Electrical or Mechanical Engineering. In the fifth or graduate year a student will divide his time among the major and minor subjects listed below. Students in the fifth year will make an inspection trip to and report on various hydro-electric and steam power plants in the state.

The degree may ordinarily be obtained in one year after the conferring of the bachelor's degree, but in certain cases, where the preliminary training of the candidate has been insufficient, two years may be necessary.

Instruction is given by means of lectures, recitations, and seminars, in connection with appropriate work in the laboratory, drawing room, and field. To this end the civil engineering laboratories in Phillips Hall are well equipped. A library of text and reference books in Civil Engineering, as well as files of the leading journals, is at the disposal of all the students.

**Courses for Graduates and Advanced Undergraduates**

14abc. STRUCTURES. Prerequisite, Engineering 5abc.

Graphical and analytical determination of stresses occurring in engineering structures, such as roofs, bridges, retaining walls, etc. The design of simple structures in steel and timber. *Two lecture hours a week, fall, winter, and spring quarters.* Credit, 1 course. Professor Braune.

15abc. ENGINEERING DESIGN.

Application of principles in course 14 to specific problems in the design of roofs, bridges, retaining walls, water towers, and other structures. *Three laboratory hours a week, fall, winter, and spring quarters.* Credit, ¾ course. Professor Braune.

24abc. REINFORCED CONCRETE STRUCTURES. Prerequisite, Engineering 5abc.

Development of the mathematical principles involved in the design of plane and reinforced concrete beams, slabs, columns, foundations, retaining walls, arches, and girder bridges. *Two lecture hours a week, fall, winter, and spring quarters.* Credit, 1½ courses. Professor Hickerson.

25abc. ENGINEERING DESIGN.

Application of the principles in course 24 to specific problems in the design of reinforced concrete buildings and bridges. *Three laboratory hours a week, fall, winter, and spring quarters.* Credit, ¾ course. Professor Hickerson.

34abc. HYDRAULIC AND SANITARY ENGINEERING. Prerequisite, Engineering 32bc.

The fundamentals of design, construction, and operation of water supply and sewerage systems as applied to municipalities and rural communities. Attention is given to preliminary studies of rainfall, stream flow, and storage as applied to both water supply and water power. *Three lecture hours a week, fall, winter, and spring quarters.* Credit, 1½ courses. Professors Saville, Baity.

35abc. SANITARY ENGINEERING DESIGN.

Application of principles in course 35 to specific problems in the general layout of simple projects for water works and sewerage. Considerable time is spent in the laboratory performing routine tests of water and sewage. *Three laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $3.00 fall quarter; $4.00 winter and spring quarters.* Credit, ¾ course. Professors Saville, Baity.

44a. CITY PLANNING.
Growth of cities; street plans; subdivisions; housing; recreation facilities; zoning; transportation terminals; traffic regulations. *Three lecture hours a week, fall quarter.* Credit, ½ course. Professor ————.

44b. HIGHWAY ENGINEERING. Prerequisite, Engineering 23s or equivalent experience.
A study of location, construction, and maintenance of the various types of highways; characteristics of road materials; highway administration, legislation, and organization. *Three lecture hours a week, winter quarter.* Credit, ½ course. Professor ————.

44c. RAILWAY ENGINEERING. Prerequisite, Engineering 23s, or equivalent experience.
Roadbed construction; ballast; ties and tie-plates; rails; frogs and switches; fences and cattle guards; bridge and trestle floors; track signs, etc. *Three lecture hours a week, spring quarter.* Credit, ½ course. Professor ————.

45abc. ENGINEERING DESIGN.
Application of principles in course 44 to specific problems in city planning and the physical testing of road materials. *Three laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $3.00 a quarter.* Credit, ¾ course. Professor ————.

### Courses for Graduates

100abc. CONTRACTS AND SPECIFICATIONS.
A course covering the laws of contracts, a detailed study of methods of writing correct specifications, the matter of securing or submitting bids, and the subject of bid bonds. Credit, 1½ courses. Professors Braune, Saville.

105abc. ADVANCED STRENGTH OF MATERIALS. Prerequisite, Engineering 5abc.
General theory of flexure, combined stresses, Lamé's theory for thick hollow cylinders, flexure of curved beams; and other theoretical and empirical matter on the general subject of strength of materials that is not treated exhaustively in the undergraduate curriculum of most engineering schools. Credit, 1½ courses. Professor Hickerson.

114abc. ADVANCED STEEL STRUCTURES. Prerequisites, Engineering 14abc and Engineering 24abc.
Secondary stresses and statically indeterminate structures, including steel arches, cantilever, suspension, and movable bridges. Credit, 1½ courses. Professors Braune, Hickerson.

124abc. REINFORCED CONCRETE STRUCTURES. Prerequisites, Engineering 14abc and Engineering 24abc.
A study of the theory and design of multiple arch dams, domes, rigidly connected frames, unsymmetrical bridges, etc. Credit, ½ courses. Professor Hickerson.

130abc. SANITARY ENGINEERING. Prerequisites, Engineering 34abc and Engineering 35abc, or equivalent.
An advanced course in the design and operation of water supply and sewerage systems, and water and sewage purification plants, including preliminary studies, design of piping, pumps and filters, water rates, leakage surveys, financial management, etc. Occasional lectures will be given by practicing engineers and waterworks superintendents. Credit, 1½ courses. Professors Saville, Baity.

131abc. RESEARCH IN HYDRAULIC AND SANITARY ENGINEERING. Prerequisites, Engineering 34abc and 35abc, or equivalent.

For graduate or special students desiring to conduct investigations in hydrology, water or sewage treatment, or stream pollution. *Laboratory fee, $5.00 a quarter.* Credit, 1 to 3 courses. Professors Saville, Baity.

132a. HYDROLOGY. Prerequisites, Engineering 34abc and Engineering 35abc, or equivalent.

A detailed study of rainfall, stream flow, meteorology, and other factors influencing hydrological investigations. The application of modern statistical methods to such problems is particularly stressed. *Laboratory fee, $2.00.* Credit, ½ course. This course may be continued for additional credit. Professor Saville.

133abc. SANITARY CHEMISTRY AND BIOLOGY FOR ENGINEERING STUDENTS. Prerequisites, Chemistry 1-2, Engineering 34abc, and Engineering 35abc, or equivalent.

A course designed to give intensive training in the laboratory methods employed in sanitary engineering practice. The work includes microscopical examinations; physical, chemical, and bacteriological determination on water, air, milk, sewage, and industrial wastes; the analysis of sand and gravel for filtration purposes; limnological studies of streams and reservoirs; stream pollution investigations; and the application of laboratory tests to the control of sanitary works. Class and laboratory exercises are supplemented by field work and plant inspections. *Laboratory fee, $5.00 a quarter.* Credit, 1 to 3 courses. Professor Baity.

134bc. WATER POWER ENGINEERING. Prerequisites, Engineering 132a or equivalent.

The investigation and design of water power developments, including preliminary hydrological studies, investigation of dam foundation, dam design, characteristics and selection of turbines, etc. A complete report will be prepared, including estimated cost of development, market for power, relation to other power systems and financing. This course may be followed by Engineering 164. *Laboratory fee, $2.00 a quarter.* Credit, 1 course. Professor Saville.

140abc. RESEARCH IN HIGHWAY ENGINEERING.

Investigation of materials in highway engineering through coöperation with the Highway Commission. This course is open to research fellows only. Fellowships will be awarded to worthy graduate students who can present the proper qualifications. Credit, 1 to 3 courses. Professor Braune.

145abc. DETAILED LABORATORY STUDY OF HIGHWAY MATERIALS.

The students will be given problems for investigation that are being constantly suggested in the scientific construction and betterment of highways. Credit, 1 to 3 courses. Professor ————.

## DEPARTMENT OF CLASSICAL LANGUAGES AND LITERATURES

GEORGE HOWE, WILLIAM STANLY BERNARD, GUSTAVE ADOLPHUS HARRER, Professors.

SHIPP GILLESPIE SANDERS, JAMES PENROSE HARLAND, Associate Professors.

Graduate work in the Department of Classical Languages and Literatures is designed to meet the needs of three classes of students: (1) those who intend by intensive study and research to specialize in the classics; (2) those who are teachers (or who are preparing to teach); (3) those who desire a knowledge of the classical civilizations for cultural purposes.

1. Intensive study and research are made possible through advanced lecture courses, seminars, a well-equipped library, and facilities for exchange of books with libraries of other large universities. Also for each language a fund is provided for the purchase of books for specialized advanced study. The department has its own seminar room in the central library, which is well equipped with standard editions; books of reference, such as Pauly-Wissowa, Daremberg-Saglio, Müller's *Handbuch, Corpus Inscriptionum Latinarum, Thesaurus Linguae Latinae, Oxyrhynchus Papyri* and numerous others; and complete sets of journals, including: *The Classical Journal, The Classical Weekly, Studies in Philology, Classical Philology, American Journal of Philology, American Journal of Archeology, Journal of Hellenic Studies, Journal of Roman Studies, The Classical Review, The Year's Work in Classical Studies, Hermes, Glotta, Philologische Wochenschrift, Jahresbericht der Klassischen Altertumswissenshaft, Philologus, Rheinisches Museum, Revue de Philologie, Notizie degli Scavi, Speculum, L'année Epigraphique, Supplementum Epigraphicum, The Classical Quarterly.*

2. In view of the constantly increasing demand for well trained teachers in secondary schools, courses are offered designed in content and method to meet this demand. Such prospective teachers should apply for the master's degree in Latin or their major subject. One course only in Greek, Greek 14 (Comparative Literature 14), is required for such students. This course needs no knowledge of the Greek language.

3. The department aims also to coöperate with the other language departments in the University in making available for culture and comparative work in literature the great literatures of the world. To this end courses in Greek and Latin literature are offered, which do not require ability to read either language in the original. Such courses are designed to place emphasis on aspects of the Greek and Latin genius; forms of literature created and perpetuated, and their permanent contribution to western civilization. Such courses may be elected as part of a major for the degree of Master of Arts in the Department of Comparative Literature; and as a minor, or part of a major, in other departments.

### Requirements for Advanced Degrees

At present an advanced degree may be taken in either Greek or Latin, or in both, with one language as the major and the other as the minor field of study. Students majoring in either of the two languages will probably be required to take certain courses in the history of the literature of Greece and Rome, and may be required, if the department thinks necessary, to take work in Ancient History.

Requirements for advanced degrees are stated in general on pages 27-36 of this catalogue. Exact prescription of courses can be determined only upon a knowledge of the needs of the individual applicant.

The department regularly offers courses in the Summer School.

## GREEK

### Courses for Graduates and Advanced Undergraduates

21-22. GREEK DRAMA: ADVANCED COURSE. Prerequisite, Greek 6. An extended reading and study of the Greek drama, with lectures on the origin, history, and structure of the drama. *Five hours a week, two quarters.* Professor Bernard or Professor Sanders.

30. GREEK HISTORY. Prerequisite, Greek 1-5 or the equivalent. Selections from the Greek historians, chiefly Herodotus, will be read and reports will be made on related topics in Greek History. *Five hours a week, fall quarter, on application.* Professor Harland.

31. GREEK HISTORY. Prerequisite, Greek 1-5 or the equivalent.
Selections from Thucydides will be read and the history of Athens and Sparta will be reviewed with a view to explaining the underlying causes of the Peloponnesian War. *Five hours a week, winter quarter, on application.* Professor Harland.

36. GREEK DRAMATIC LITERATURE.
A course designed to embrace the origin, development, technique, and content of Greek drama, with emphasis on tragedy. An interpretation of Greek life and thought as contributing to world progress. *Five hours a week, winter quarter.* Professor Bernard.

43. THE GREEK NEW TESTAMENT. Prerequisite, Greek 7.
The Acts of the Apostles, study of grammar and diction, comparison with English versions; the Gospels, with selections from the Epistles; the principles of textual criticism, sources and history of the Greek text and the versions. *Five hours a week, one quarter, on application.* Professor Bernard.

53. PLATO IN ENGLISH TRANSLATION.
A course designed to lead the student into Platonic philosophy and literary criticism. *Five hours a week, spring quarter.* Professor Bernard.
NOTE. Greek 14 may be taken as a graduate course. In such cases the scope of the work will be considerably expanded and concentrated on some special phase of the subject required. See General Catalogue.

**Courses Primarily for Graduates**

101abc. GREEK SEMINAR.
This course is devoted to the study in detail of particular authors or periods in Greek literature, the subject matter varying from year to year. It calls for wide reading in the Greek authors selected and in the critical literature concerning them, with oral and written reports. Lectures and conferences. Professors Bernard, Harland, Sanders.
(For additional courses see under Comparative Literature, pages 27-36. Attention is called also to courses in Comparative Philology offered by the Department of German. See pages 73-74.

## LATIN

**Courses for Graduates and Advanced Undergraduates**

12. ROMAN HISTORICAL LITERATURE. Prerequisite, Latin 1-3.
A study of the structure, purposes, and methods of the most significant works. Translation and reading in English from the literature, reports, lectures. The course alternates with course 13. (Not offered in 1929-1930). *Five hours a week, fall quarter.* Professor Harrer.

13. ROMAN DRAMATIC LITERATURE. Prerequisite, Latin 1-3.
A study of the development of Latin comedy and tragedy: reading of selected plays. The course alternates with course 12. *Five hours a week, fall quarter.* Professor Harrer.

19. PROSE WRITINGS OF THE REPUBLIC. Prerequisite, Latin 1-3.
An account of the development of prose literature from Cato to Cicero, with special studies of certain types and readings from the chief works. *Five hours a week, winter quarter.* Professor Sanders.

20. CICERO: POLITICAL CAREER AND WORKS. Prerequisite, Latin 1-3.
A study of Cicero, as statesman and advocate. Selected letters, as well as a number of orations, will be read. *Five hours a week, spring quarter.* Professor Harrer.

30. MEDIÆVAL LATIN. Prerequisite, Latin 1-3, or the equivalent.
The course is principally concerned with translating from the Latin works of leading authors of the Middle Ages, and with some study of the chief differences between Classical and Mediæval Latin. *Five hours a week, winter quarter.* Professor Harrer.

51. THE LATIN EPIC.
The history of the Latin Epic; detailed study of the *Æneid. Five hours a week, spring quarter.* Professor Howe.

### Courses Primarily for Graduates

100. PROBLEMS OF RESEARCH.
The purpose of this course is to acquaint the student with the general field of classical studies and with the opportunities and methods of research. Typical problems will be reviewed, the nature and value of evidence discussed, and papers on assigned topics prepared. *Five hours a week, fall quarter.* Professor Howe or Professor Harrer.

101-102-103. LATIN SEMINAR.
The course in each quarter is devoted to the study in detail of a particular author or period in Roman literature, the choice of subject being determined, as far as possible, by the needs of the group. Typical subjects of recent years have been: Catullus, Lucretius, Cicero, Virgil, Horace, The Elegists, Tacitus, Post-Augustan Prose, Post-Augustan Poetry, etc. *Five hours a week, fall, winter, and spring quarters.* Professors Howe, Harrer.

104. LATIN EPIGRAPHY.
The aim of the course is to acquire facility in the deciphering and translating of inscriptions, to study in detail a selection of significant inscriptions and their values in the field of Roman studies. *Five hours a week, fall quarter.* Professor Harrer.

105. LATIN PALEOGRAPHY.
The aim of the course is a study of the more important scripts, practice in decipherment, and the methods of textual criticism. *Five hours a week, one quarter, on application.* Professor Harrer.

For additional courses, see below under Courses Requiring no Knowledge of the Greek or the Latin Language and Courses in Comparative Literature, pages 49-50. Attention is called also to courses in Comparative Philology offered by the Department of German. See pages 73-74.

## DEPARTMENT OF COMPARATIVE LITERATURE

NORMAN FOERSTER, FREDERICK HENRY KOCH, WILLIAM STANLY BERNARD, STURGIS ELLENO LEAVITT, MITCHELL BENNETT GARRETT, URBAN TIGNER HOLMES, JR., WILLIAM FLINT THRALL, GEORGE COFFIN TAYLOR, Professors.

NICHOLSON BARNEY ADAMS, Associate Professor.

JOHN CORIDEN LYONS, Assistant Professor.

### Courses for Graduates and Advanced Undergraduates

54. THE MIDDLE AGES. This course alternates with course 57.
A survey of mediæval France, England, Germany, Spain, Italy, and Byzantium, from the point of view of civilization and especially art and literature. (Given in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Holmes.

57. THE RENAISSANCE. This course alternates with course 54. It is the same as History 36.
An account of the establishment of modern European culture. Lectures on the history, science, fine arts, literary scholarship, and literature of the Renais-

sance in Italy, France, Germany, the Netherlands, and England. (Given in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professors Holmes (Chairman), Bernard, Taylor, Thrall, Garrett, Adams, Lyons.

58. CERVANTES AND ENGLISH LITERATURE.
The romances of chivalry in Spain; Cervantes' *Don Quixote* and its influence upon the work of Fielding, Smollett, and Sterne. The *Novelas Ejemplares* as a source of plots for Restoration dramatists. *Five hours a week, fall quarter.* Professor Leavitt.
(Attention is called to English 85, Arthurian Romances.)

68. COMPARATIVE DRAMA.
A general survey of the drama and the theatre from Aeschylus to Ibsen. Special attention is given to the function of the drama in representative plays of the leading European dramatists. *Five hours a week, winter quarter.* Professor Koch.

71. THE MODERN DRAMA.
A study of representative plays of recent times, beginning with Ibsen. Special attention is given to the function of the drama in interpreting modern thought and changing social conditions. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Koch.

78. LITERARY CRITICISM.
The principles which have animated classical, romantic, and realistic literature. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Foerster.

90. DIRECTED READING. Open only to seniors and graduates who receive permission from the chairman of the department. *Equivalent of three hours a week, fall, winter, and spring quarters.*

NOTE. Attention is also called to the following courses: Latin 51 (The Latin Epic), Greek 53 (Plato), Italian 56 (Dante), in all of which the reading is done in translations.

**Courses Primarily for Graduates**

117. STUDIES IN NINETEENTH CENTURY ROMANTICISM IN ENGLAND.
Wordsworth and Coleridge: the English and Continental aspects of their thought and art. *Five hours a week, fall quarter.* Professor Foerster.

118. STUDIES IN NINETEENTH CENTURY ROMANTICISM IN AMERICA.
Emerson and Whitman: the American and European aspects of their thought and art. (Given in 1930-1931 and in alternate years.) *Five hours a week, winter quarter.* Professor Foerster.

141. Research in a special field under the direction of a member of the department.

## DEPARTMENT OF ECONOMICS AND COMMERCE

DUDLEY DEWITT CARROLL, CLAUDIUS TEMPLE MURCHISON, ERLE E. PEACOCK, ERICH W. ZIMMERMAN, Professors.
JOHN BROOKS WOOSLEY, GUSTAVE T. SCHWENNING, MALCOLM D. TAYLOR, *CORYDON P. SPRUILL, JOSEPH M. LEAR, MILTON S. HEATH, HARRY D. WOLF, CLARENCE HEER, Associate Professors.
H. ALBERT HARING, COLLIER B. SPARGER, Assistant Professors.

*On Sabbatical leave, 1928-1929

Owing to the closely allied nature of their work the departments of Economics and Commerce, formerly separate, have been merged. This arrangement reduces to a minimum duplication of effort and facilities. At the same time it emphasizes the essential unity of purpose always insisted upon by the two departments; namely, that the commerce courses should arise from a groundwork of economic theory and should lead not only to explanations of characteristic business organization and practice, but also to an understanding of the relationships between business and economic life as a whole.

For convenience to the student, those courses in which the subject matter is treated mainly from a social point of view are grouped separately and classified under the heading, Division of Economics. Those courses tending to emphasize practice rather than principle are grouped in the Commerce division.

The Economics division is designed to provide training which is in thorough accord with the commonly accepted ideal of a liberal arts education. At the same time, it aims at producing trained economists qualified to undertake the more responsible types of business or professional activity which require familiarity with the basic facts and problems of commerce and industry.

For graduate students, the Commerce division of the department offers a fairly high degree of specialization in various aspects of business. It recognizes that the business world is calling insistently for highly specialized experts, such as statisticians, research agents, field investigators, financial advisers, personnel managers, commercial agents, etc. The government, in connection with its industrial and fiscal operations, its regulation of business, and its consular service, also requires a large number of men who have an understanding of the highly complicated phases of trade and industry.

The student may pursue specialized work in any of the following study groups: factory organization and administration; banking and finance; marketing; advertising and salesmanship; merchandising; personnel management; risk-bearing and insurance; transportation and shipping; business law; accountancy; foreign trade; municipal administration; commercial teaching. (For detailed description of these study groups, see the bulletin of the School of Commerce).

The department offers two graduate degrees, Master of Arts, and Master of Science. Candidates for the arts degree should devote two-thirds of their time to courses in Economics; their other courses must be in a closely allied department.

In order to qualify for the degree of Master of Science in Commerce, the candidate must hold the degree of B.S. in Commerce, or its equivalent, from this institution, or a like degree from any other standard college or university. He must devote two-thirds of his time to the courses in the Commerce division, his other courses being in Economics or in a closely allied department.

## ECONOMICS

### Courses for Graduates and Advanced Undergraduates

12. BUSINESS CYCLES. Prerequisite, Economics 1-2.

A study of the alternating periods of depression and prosperity. The underlying causes of panics and crises. Fluctuations in prices, trade volume, and physical production. *Five hours a week, winter or spring quarter.* Professor Murchison.

13. PUBLIC FINANCE. Prerequisite, Economics 1-2.

A general study of government business covering the principles involved in public revenues and expenditures—local, state, and national; a treatment of the just distribution of public charges and their incidence; and a study of the growth and organization of modern tax systems. *Five hours a week, fall quarter.* Professor Heer.

14. PROBLEMS IN PUBLIC FINANCE. Prerequisite, Economics 13.
An advanced critical study of certain present problems in government finance. *Five hours a week, winter quarter.* Professor Heer.

15. TRANSPORTATION. Prerequisite, Economics 1-2.
A general study, from the historical and critical points of view, of railway transportation in such representative countries as Great Britain, France, Italy, Germany, and the United States; with some consideration of passenger and freight traffic and rates, and the State's relation to railways. *Five hours a week, fall quarter.* Professor Heath.

20. RISK AND RISK-BEARING. Prerequisite, Economics 1-2.
A study of the risk element in modern industry together with the measures which have been devised to meet it. This course should precede the study of insurance. *Five hours a week, fall quarter.* Professor Lear.

24. PRINCIPLES OF MARKETING. Prerequisite, Economics 1-2.
This course sets forth the principles underlying general marketing practice. The assignments relate to marketing facilities and services (such as transportation, warehousing, grading, financing, assembling, and distributing), marketing agencies and organizations, organized exchanges and future trading, and certain problems of competition and price policy. *Five hours a week, winter quarter.* Professor Haring.

26. INTERNATIONAL TRADE: THEORY AND POLICIES. Prerequisite, Economics 1-2.
In this course international trade is viewed from the standpoint of the political economist, emphasizing the social aspects. After an historical study of the past and a critical analysis of the present foreign commerce of the United States and principal commercial rivals, an effort is made to apply to a survey of our foreign markets and of our foreign sources of supply the general principles of economic theory insofar as they pertain to international trade. Following this the payment balances of this country and of other leading countries engaged in world commerce are critically studied. Finally, the most important theories of international trade are reviewed in the light of historical development. *Five hours a week, fall quarter.* Professor Zimmerman.

27. COMMERICAL POLICY OF MODERN NATIONS. Prerequisite, Economics 26.
After a general survey of international commercial policy up to the close of the Napoleonic Wars, a more detailed comparative study of the commercial policy of the leading nations during the last hundred years is made. The following countries are included: United States, Great Britain, France, Germany, Russia, Italy, Canada, Argentina, and India. Special attention is given to traffic problems, colonial policies, and to imperialism. The present world resources situation and its probable effect on future commercial policy are appraised. (Alternates with Commerce 46; not given 1928-1929.) *Five hours a week, winter quarter.* Professor Zimmerman.

30. AN INTRODUCTION TO THE LABOR PROBLEM. Prerequisite, Economics 1-2.
To the extent that the competitive wage system fails (a) to provide for the laborer an adequate basis for a decent living and (b) to draw from him the services he ought to render to industry, there appears to be a "labor problem." The purpose of this course is to make an analytic survey of the modern labor problem in its major aspects, such as unemployment, low wages, industrial accidents and diseases, overstrain and superannuation, and the status of the worker in industrial society. Trade unionism and the labor movement and intervention by the state in behalf of the worker, social methods of coping with the problems of labor, are also surveyed. *Five hours a week, fall or winter quarter.* Professor Wolf.

31. LABOR AND SOCIAL CONTROL. Prerequisite, Economics 30.
An advanced course in social methods of coping with labor problems. These fall roughly into three classes, (a) self-help on the part of the workers, which embraces trade unionism, labor political activity, and consumers' coöperation; (b) employers' policies, such as welfare work and paternalism, profit-sharing, and company unionism; and (c) intervention by public authority, as through labor legislation, conciliation and arbitration, and judicial limitation of private property rights. Insofar as possible the various topics will be studied in terms of the southern labor situation. *Five hours a week, spring quarter.* Professor Wolf.

35. TYPES OF BANKING. Prerequisite, Economics 10-11.
A comparative study of specialized types of banking institutions—their organization, methods, functions, and relationship to the financial organization of society in general. The course will include trust companies, investment banks, commercial paper houses, commercial discount companies, savings banks, and the various classes of agricultural credit banks. (Alternates with Commerce 31 and will be given in 1929-1930.) *Five hours a week, spring quarter.* Professor Murchison.

40. THEORIES OF ECONOMIC REFORM. Prerequisite, Economics 1-2.
A critical analysis of the leading proposals for reform in the present economic system, including Socialism, Bolshevism, Single Tax, and Industrial Democracy. *Five hours a week, fall or spring quarter.* Professor Carroll.

47. ADVANCED COMMODITY ECONOMICS. Prerequisite, Economics A, 1-2.
In this course the demand and supply conditions of a few commodities selected to represent types are studied. The institutional factors affecting these conditions are critically examined with particular reference to price behavior. (Alternates with Commerce 51 and will be given in 1930-1931.) *Five hours a week, spring quarter.* Professor Zimmerman.

55. THEORIES AND FORMS OF BUSINESS ENTERPRISE. Prerequisite, Economics 1-2.
This course deals primarily with the combination movement. But it will treat this problem in its widest aspects: the historical background and the evolution of modern business forms, the theory of business enterprise, the structures and functions of organization, the relation of these questions to social welfare. Pools, trade associations, mergers, trusts, bankers' control, price control, are some of the principal questions which will be considered. *Five hours a week, winter quarter.* Professor Heath.

### Courses for Graduates

100abc. ADVANCED ECONOMIC THEORY. Prerequisite, Economics 1-2.
A survey of economic theory from the standpoint of the evolution of modern industrial society. The three courses will not only include a review of the works of the leading economic writers, but will also summarize the principal physical, psychic, and social factors that have shaped economic theory and economic institutions. *Five hours a week, fall, winter, and spring quarters.* Professor Heath.

106abc. SEMINAR IN ECONOMICS. Prerequisite, Economics 1-2, 10-11.
A general introduction to methods of advanced study. Some phase of economic activity in harmony with the interests of the members of the seminar is selected for consideration. Methods of work and content receive equal emphasis. *Two hours a week, fall, winter, and spring quarters.* Professor Murchison (Chairman.)

112. ECONOMIC DYNAMICS.

This course focuses upon the changing nature of the modern economic organization. An effort is made to identify the more important of the dynamic elements, and to evaluate the significance of each in the general process of change. Attention is given to the readjustment processes and problems of particular industries, as well as to general trade, finance, and social well-being. Topics covered would include consumption behavior, income distribution, capital accumulation, money and credit conditions, new developments in marketing, production, transportation. The method of study will be inductive. *Hours arranged, fall, winter, and spring quarters.* Professor Murchison.

NOTE. Registration for this course must be approved by the professor in charge.

114. RESEARCH COURSE IN PUBLIC FINANCE.

The changing forms and distribution of wealth and income together with the expanding conceptions of governmental services make imperative a constant re-examination of fiscal problems. The scope of operations and the magnitude of revenues and expenditures emphasize the importance of administrative efficiency. Critical studies in this field are carried on under the supervision of the professor in charge. *Fall, winter, and spring quarters.* Professor Heer.

NOTE. Registration for this course must be approved by the professor in charge.

126. INTERNATIONAL ECONOMIC RELATIONS.

An increasing share of the economic life of mankind is being lifted out of the sphere of local and national activities, and is being subjected to world-wide influences. This tendency affects not only those business interests of ours directly engaged in foreign trade, but in general reacts upon our political position as a world-power, and materially influences our domestic and economic life.

The aim of this course is to provide graduate students interested in world economics the opportunity of pursuing advanced research along such lines as these: the movement of world prices; international commodity price control; the world food problem; the population question; advancing industrialization and future supply of raw materials; problems of international law affecting economic activities; foreign investments; commercial treaties; colonial policy, etc. *Hours arranged, fall, winter, and spring quarters.* Professor Zimmerman.

NOTE. Registration for this course must be approved by the professor in charge.

130. HUMAN RELATIONS IN INDUSTRY.

This course is a seminar in selected topics in labor economics and aims to provide a limited number of graduate students an opportunity of doing critical and constructive work in this field. In view of the fact that there are grave problems connected with the adjustment of the workers to the new industrial and social order that is being developed in the South Atlantic States, the general topic "Labor Problems of the South" was selected for study in the winter quarter of 1928. The course will take this form again if a sufficient number of students are interested. *Fall, winter, or spring quarter, hours arranged.* Professor Wolf.

NOTE. Registration for this course must be approved by the professor in charge.

141. SEMINAR.

Individual research in a special field under direction of a member of the department.

## COMMERCE

### Courses for Graduates and Advanced Undergraduates

4. ACCOUNTING PRACTICE. Prerequisite, Commerce 1 and prerequisite or corequisite, Commerce 2.

A laboratory course. Bookkeeping systems and records for the various industries prevalent in North Carolina are studied and practice sets for each are prepared. A tentative list will include tobacco manufacturing, furniture manufacturing, cotton goods manufacturing, automobile sale agencies and garages, banks in small cities, and municipalities. *Six hours a week, spring quarter. Laboratory fee, $3.00.* Professor Peacock.

5. COST ACCOUNTING. Prerequisite, Commerce 1-2.

Lectures with laboratory work. Methods for collection of data relative to prime costs and a careful analysis of various methods of burden distribution. Application of principles will be made in the laboratory by means of budgets for cost accounting in different classes of enterprise. *Five hours a week, fall quarter. Laboratory fee, $3.00.* Professor Peacock.

6. AUDITING. Prerequisite, Commerce 1-2.

Lectures and problems. Kinds of audits, system of accounts, methods of conducting audits, and problems in auditing. *Five hours a week, winter quarter. Laboratory fee, $3.00.* Professor Peacock.

7. INCOME TAX PROCEDURE. Prerequisite, Commerce 1-2.

This course consists of a thorough study of both the federal and state income tax laws and the problems that arise in the making of the various returns. The preparation of the tax returns and claims for refund will be undertaken as laboratory exercises. *Five hours a week, winter quarter. Laboratory fee, $2.00.* Professor Sparger.

8. C. P. A. PROBLEMS. Prerequisites, Commerce 1, 2, 3, 5, 6.

This course deals with the questions and problems given by the different states and the American Institute in their C. P. A. examinations. Typical problems are solved, and solutions prepared by the leading accountants of the country are studied. (This course will be given only in case as many as five students register for it.) *Three hours a week, spring quarter.* Professor Peacock.

9. GOVERNMENTAL ACCOUNTING. Prerequisites, Commerce 1, 2, 3, 5.

Lectures and laboratory work. A study of Budgeting Accounting and its application to the various governmental units; the differences between Fund Accounting and Commercial Accounting; methods of collecting data recorded in books of original entry; and the preparation of financial statements. A survey will be made of systems for educational institutions, and for state, county, and city governments. Laboratory work will consist of practical problems. Field trips will be taken in order to study the system used by the state of North Carolina, the system prepared by the County Government Advisory Commission for counties, and other available systems. *Five hours a week, spring quarter. Laboratory fee, $2.50.* Professor Sparger.

11. PRINCIPLES OF INDUSTRIAL MANAGEMENT. Prerequisite, Economics 1-2, Commerce 10.

This course covers the problems involved in the construction, equipment, and administration of a manufacturing enterprise. The unit of study is the factory. The subject matter is treated under four heads: the underlying principles of production, the agencies of production, the control of production operations, and the establishment of production standards. *Five hours a week, winter quarter.* Professor Schwenning.

12. CORPORATION FINANCE. Prerequisite, Economics 1-2, Commerce 1 and 10.

A study of the principles and practice of corporate financing. Among the topics considered are: the methods of raising permanent capital, problems of current financing, the treatment of earnings, and financial problems incident to expansion and reorganization. Specific problems and reports are employed to illustrate and emphasize the principles involved. *Five hours a week, winter quarter.* Professor Woosley.

14. PERSONNEL MANAGEMENT. Prerequisite, Economics 1-2, Commerce 10.

A scientific study of the methods of hiring and handling personnel in the various lines of industry. The supply, selection, training, promotion, transfer, and discharge of employees; the computation and significance of labor turnover; housing, educational and recreational facilities; the functions of a personnel department with reference to efficiency and the maintenance of good will between employees and employers. *Five hours a week, spring quarter.* Professor Schwenning.

16. INDUSTRIAL MANAGEMENT: THEORIES AND PRACTICES. Prerequisite, Economics 1-2, Commerce 10. Open only to selected seniors and graduate students.

A critical examination of the economic, social, and ethical aspects of modern business administration. Current theories of organization and management will be taken up and subjected to careful scientific analysis. Practices will be compared with theories. An attempt will be made to formulate the underlying principles upon which the administration of modern industrial enterprise rests. *Three hours a week, winter quarter.* Professor Schwenning.

17. TIME AND MOTION STUDY. Prerequisite, Economics 1-2; Commerce 10, 11; or Commerce 10E, 11E, 12E.

A presentation of the elements of time and motion study as a phase of scientific management and as a device used by modern industrial establishments to measure the productive capacity of workers on specific jobs and to set production standards. The course will include a discussion of the following: fundamentals and development of time and motion study; equipment and qualifications of a time study man; collection and tabulation of data; organization of the time study department; etc. Students will be given practice in making time studies and in applying the results. (Alternates with Commerce 16 and is given in 1929-1930). *Three hours a week, winter quarter.* Professor Schwenning.

31. BANKING PRACTICE AND FOREIGN EXCHANGE. Prerequisite, Economics 10-11.

Organization and management of a commercial bank. Duties and responsibilities of different departments. Bank accounting. Handling of credit instruments, checks, drafts, acceptances, bills of exchange. Critical examination of present methods and standards. The course will also include a study of international banking operations; the credit instruments used in financing trade between nations; the forces determining rates of exchange. (Alternates with Economics 35 and will be given in 1930-1931.) *Five hours a week, spring quarter.* Professor Murchison.

36. INVESTMENTS. Prerequisite, Economics 1-2, Commerce 1-2, 12.

This course is essentially a laboratory study of corporate securities from the standpoint of the investor. Primary emphasis is placed upon the development of technique and standards of investment analysis. Each student is required to make an intensive study of a company engaged in each of the leading fields of corporate activity with the view of making an investment report thereon. *Five hours a week, spring quarter.* Professor Woosley.

38. INSURANCE: LIFE.
A study of the principles and technique of life insurance, including disability, accident, and group insurance. Some attention will also be given to the investment operations of insurance companies. *Five hours a week, winter quarter.* Professor Lear.

39. INSURANCE: FIRE, MARINE, BOND, AND TITLE.
In this course, an effort is made to consider as far as possible the wide range which the insurance function covers and the probable trend of its future development. The topics noted in the title of the course are studied and as many others as time will permit. *Five hours a week, spring quarter.* Professor Lear.

41. MARKETING PRACTICE. Prerequisite, Economics 1-2, 24.
This course covers essential technique in the marketing of specific commodities as well as a development of the principles followed in practice. Each of the more important commodities or groups of commodities is discussed from the marketing standpoint, and the technical marketing operations on organized exchanges and in various types of business organizations are examined. *Five hours a week, spring quarter.* Professor Haring.

46. FOREIGN TRADE PRACTICE. Prerequisite, or corequisite, Economics 24.
This course treats of foreign trade as a business profession and serves to prepare for entrance into the field; emphasis throughout is on practical problems.

Part I. The organization of foreign trade: export departments; middle men and their functions: coöperation.

Part II. Methods: direct versus indirect exporting; export campaigns; sales policies.

Part III. Foreign market analysis.

Part IV. Paper work and technical procedure in exporting and importing, including foreign trade financing. *Five hours a week, winter quarter.* Professor Zimmerman.

50. TRAFFIC PROBLEMS. Prerequisite, Economics 15.
A study of current technical problems in the field of transportation and traffic management. (This course will be given only in case as many as five students register for it.) *Three hours a week, winter quarter.* Professor Heath.

51. OCEAN SHIPPING. Prerequisite, Economics 1-2.
A study of the elements of water transportation, trade routes, ports and terminal facilities, vessel types, ship operation and management, ocean freight service and rates, marine insurance. The problem of our merchant marine and national policies affecting it are also discussed. (Alternates with Economics 47 and will be given in 1929-1930.) *Three hours a week, spring quarter.* Professor Zimmerman.

### Courses for Graduates

106abc. SEMINAR IN COMMERCE.
A general introduction to methods of advanced study. Some phase of business activity in harmony with the interests of the members of the seminar is selected for consideration. Methods of work and content receive about equal emphasis. *Fall, winter, and spring quarters.* Professor Murchison (Chairman).

141. SEMINAR.
Individual research in a special field under direction of a member of the department.

## DEPARTMENT OF EDUCATION

MARCUS CICERO STEPHENS NOBLE, NATHAN WILSON WALKER, EDGAR WALLACE KNIGHT, MARION REX TRABUE, ESEK RAY MOSHER, ARTHUR MELVILLE JORDAN, WILLIAM JOHN MCKEE, Professors.

CARLETON ESTEY PRESTON, RALPH WINFRED TYLER, HOWARD FREDERICK MUNCH, PRESTON COOKE FARRAR, ROY WILLIAMSON MORRISON, Associate Professors.

It is the primary function of the Department of Education to train teachers and administrative officers for the public schools, normal schools, teachers' colleges, and departments of education in colleges. This training must include not only an intimate knowledge of subject matter and of methods of instruction, but actual practice and skill in the collection and interpretation of the facts necessary in the intelligent adaptation of sound educational theory to local needs and to the individual differences of pupils.

As a consequence, there are offered in this department three types of courses: (1) those which present the facts and theories upon which modern education is founded; (2) those which develop the skill and attitude necessary in the conduct of modern schools; (3) those which aid and stimulate the student in the discovery, interpretation, and improvement of school conditions.

The Department of Education is centralized in the Peabody Building, a gift from the George Peabody Fund, equipped with recitation rooms, offices, laboratories, library, and a reading and seminar room.

It has entered into active coöperation with the local school board by which the elementary and secondary units of the local school system are open for the use of faculty and students in the department.

In like manner the rural schools in Orange County are always available for observation and study by faculty and students. This arrangement includes the Orange County Training School for Negroes. Courses of both graduate and undergraduate grade are offered in the Summer School and through extension classes, thus making it possible for teachers in service to earn credits towards the A.B., the A.B. in Education, or the A.M. degree.

In general the Department of Education strives to interpret and to serve the needs of the public schools of the state in so far as its resources will permit.

### Courses for Graduates and Advanced Undergraduates

26. PUBLIC SCHOOL EDUCATION IN THE SOUTH.

This course gives an historical survey of public school education in southern states with especial attention to its development in organization, administration, and supervision since 1876. Present-day questions in rural education are studied in the light of their historical development, and attention is given to the educational reorganization needed for the proper solution of the new rural life problems. Textbook, lectures, investigations, and reports. *Five hours a week, fall or spring quarter.* Professor Knight.

29. HISTORY OF EDUCATION IN NORTH CAROLINA.

The purpose and development of education in North Carolina as seen in the work of public, private, charity, and church schools. A comparative study of public education in North Carolina and other selected typical states of the American Union. Lectures, discussions, and assigned readings. *Five hours a week, fall or spring quarter.* Professor Noble.

31. RURAL EDUCATION.

A course planned to meet the needs of students preparing to become rural school teachers, principals, supervisors, and superintendents. It gives consideration to the organization, administration, and supervision of rural school education in the United States, with especial emphasis on the present condi-

tions in the South. The county as the unit of administration and support, federal aid and a national program for rural educational work, the application of the principles, agencies, and methods of supervision to the rural school will be studied. Textbooks, lectures, special investigations, and reports. *Five hours a week, winter quarter.* Professor Knight.

36. HISTORICAL FOUNDATIONS OF MODERN EDUCATION.
This course traces the development of some of the more important educational problems of modern times as they have been affected by the social and political facts of history, by the contributions of the leading educational theorists, and by institutional practice. It deals with the growth of national systems of education and especially with the extension of popular education in the United States. Textbooks, lectures, investigations, and reports. *Five hours a week, winter quarter.* Professor Knight.

37. SOCIAL AND EDUCATIONAL HISTORY OF THE UNITED STATES. (History 66).
The social and educational institutions and practices of the United States are traced through: (a) The period of transplanting of European institutions; (b) the period of modifications of institutional life to meet new conditions; and (c) the period of development of a social and an educational system of free common schools, high schools, and higher and technical education in harmony with the political and social ideals and institutions of America. Textbook, lectures, investigations, and reports. *Five hours a week, fall or spring quarter.* Professor Knight.

41. INTRODUCTORY COURSE IN SCHOOL ADMINISTRATION.
This course will consider some of the important problems of school administration, especially as these problems bear on the success of the teacher's work. Students without teaching experience, or teachers without a knowledge of administrative problems, should not register for the more specialized courses in the field of administration until after completing this course. Textbook, observations, and discussions. *Five hours a week, spring quarter.* Professor Trabue.

42. THE ELEMENTARY SCHOOL PRINCIPALSHIP.
This course considers the duties, qualifications, and activities of the principal of an elementary school as administrator. Textbook, assigned readings, and special reports. *Five hours a week, winter quarter.* Professor Trabue.

43. ELEMENTS OF STATISTICAL METHODS. Prerequisite, Education 1 or Psychology 1-2.
The first meeting in this course will consider various methods of collecting data for educational, psychological, social, and economic investigations. The interpretation of data by graphic and mathematical devices will be taught chiefly by examples. Numbering, tabulation, the calculation of averages and variabilities, the transmutation of measures, and simple correlations will be included. Students will be required to plan experiments and statistical investigations for the solution of problems in their own fields of interest. Readings, demonstrations, problems, reports, and critical discussion. *Five hours a week, winter quarter.* Professor Trabue.

46. CLASSROOM MANAGEMENT.
A course for prospective teachers on the organization and direction of activities in the classroom as distinguished from the administration of an entire school. Class routine, lesson planning, conduct of the recitation, and extra-curricular activities will be included. Textbook, special readings, observations, and reports. *Five hours a week, fall quarter.* Professor Trabue.

48. EVALUATING CLASSROOM INSTRUCTION.
This course is devoted to a consideration of the various methods and devices for securing a satisfactory classification of pupils and for improving instruction offered by teachers. A good course in educational measurements is prerequisite. Textbooks, investigations, reports, and discussions. *Five hours a week, summer quarter.* Professor Trabue.

55. SOCIAL POLICY AND EDUCATION.
Fundamental problems in the social and ethical theory of education. Lectures, prescribed readings, essays, and reports. This course deals with problems of social progress from the standpoint of education, attempts to define a social policy for education, and discusses the vital educational issues involved in that policy. *Five hours a week, winter quarter.* Professor Walker.

56. SUPERVISION AND MEASUREMENTS IN SECONDARY EDUCATION. Prerequisite, Education 1 or Psychology 1-2.
Standard tests for measuring the results of secondary school instruction will be examined and discussed. An effort will be made to give students some familiarity with the methods and scales. *Five hours a week, fall quarter.* Professor Trabue.

57. THE HIGH SCHOOL PRINCIPALSHIP. This course considers the duties, qualifications, and activities of the principal of a secondary school. Lectures, readings, discussions, investigations, and reports. *Five hours a week, summer quarter.* Professor Mosher.

60. CURRICULUM CONSTRUCTION.
The construction and organization of the elementary school curriculum when based upon human needs. Includes consideration of the teacher's function in curriculum construction, objectives of the school subjects, sources of curricular material and criteria for evaluating it, selection and organization of the pupil-activities through which the objectives may be attained. *Five hours a week, fall quarter.* Professors Trabue, Marks.

62. TESTS AND MEASUREMENTS IN ELEMENTARY EDUCATION. Prerequisite, Education 1 or Psychology 1-2.
Methods of measuring and improving the results of instruction in the elementary school. As much use as possible will be made of actual measured results. *Five hours a week, fall quarter.* Professor Trabue.

63. THE PSYCHOLOGY OF ELEMENTARY EDUCATION.
The psychological processes involved in the learning of reading, writing, arithmetic, history, and geography. The application of the laws of learning is made to the arrangement of material within each subject. Students registering for this course should have had Education 1 or Psychology 1-2 and one further course in Education. *Five hours a week, fall quarter.* Professor Trabue.

64. MENTAL MEASUREMENTS. Prerequisite, Education 1 or Psychology 1-2.
A study of mental tests, both individual and group. The origin of the tests will be first considered, followed by a comparative study of the various types of group and individual tests. There will be ample opportunity offered for the actual administration of the tests and the interpretation of the results. *Five hours a week, spring quarter.* Professor Jordan.

66. PROJECT ACTIVITIES IN THE ELEMENTARY GRADES.
An attempt will be made in this course to develop criteria by which children's educational activities should be evaluated, the means by which they should be tested, and the principles governing procedures in activity work. A

critical analysis will also be made of the procedures employed in developing and conducting various types of activities. Required readings, observations, discussions, and special reports. *Five hours a week, summer quarter.* Professor McKee.

67. GUIDANCE AND ADMINISTRATION OF ELEMENTARY SCHOOL PUPILS. (a) Teaching Pupils How to Study. This half of the course will consider the physical and environmental factors that condition effective study.

(b) The Pupil Personnel Program. This half of the course deals with the problems and techniques involved in helping pupils to make satisfactory social and school adjustments, in classifying and promoting pupils, in making records and reports of pupil progress, in developing a helpful program of extra-curricular activities, in dealing with the maladjusted pupil, and in handling disciplinary cases. *Five hours a week, summer quarter.* Professor McKee.

90. INVESTIGATIONS IN TEACHING.

The objectives of this course are to stimulate students to identify problems encountered in their teaching, and to teach them those methods of analysis and investigation, and those sources and interpretations of data which are helpful in finding solutions to problems. The course aims to develop in the student the attitudes requisite for intelligent study of teaching problems and the techniques and results of investigations which have been carried on in his field. Open only to teachers and school officials in service, or those who have had experience in teaching. Upon the approval of the instructor the course may be taken more than once, *providing* that the student satisfactorily investigates and reports upon new problems. *Five hours a week, summer quarter.* Professor Tyler.

### Courses Primarily for Graduates

101abcd. PROBLEMS IN SECONDARY EDUCATION.

This course is intended for advanced students and is primarily a course in investigation. To be admitted to it, a student must have pursued other courses in secondary education. Students who have not taken Education 51 may be admitted only with special permission of the instructor. At the beginning of the course each student is required to select some one problem for special investigation. The problem for investigation may be chosen by the student but must be subject to the approval of the instructor both as to field and method. A thesis will be required of each student. Throughout the year regular class discussions will be held on various problems in secondary education and assigned readings will be required. *Four hours a week, fall and winter quarters.* Professor Walker.

103abc. PROBLEMS IN EDUCATIONAL ADMINISTRATION.

A graduate course offering opportunity for intensive study and research on selected problems in the field of educational administration. The problems will be selected by the class each year, making it possible for the student to take this course more than once. Prerequisite, Education 40 and 41 or their equivalent. *Two hours a week, fall, winter, and spring quarters.* Professor Trabue.

104abc. PROBLEMS IN EDUCATIONAL MEASUREMENTS.

Students who wish to specialize in educational measurements may take this course more than once if desired, since the problems considered will differ from year to year. Prerequisite, Education 62 or 56. *Two hours a week, fall, winter, and spring quarters.* Professor Trabue.

106. PROCEDURES IN EDUCATIONAL RESEARCH.

This course, for graduate students only, will be required of all candidates for higher degrees in the fields of educational administration and elementary

education. Through the examination of selected examples of published research, members of the class will study the methods and techniques to be used in discovering, defining, and analyzing problems for investigation; in locating, gathering, and interpreting data; and in formulating and testing conclusions. The class will undertake to define outstanding problems needing investigation and will consider the various types of educational research which are applicable to these problems. A limited amount of specialization in fields of special interest to those students who are qualified may be allowed during the latter part of this coruse. *Five hours a week, summer quarter.* Professor Trabue.

109. PUBLIC SCHOOL SURVEYS.

This is a summary course in educational administration for those who have had the various specialized courses in this field. The course will use the techniques developed in the more specialized courses in administration, but it will use them in their relationships to each other and to local school situations. *Five hours a week, summer quarter.* Professor Stevens.

110abcd. PROBLEMS IN EDUCATIONAL PSYCHOLOGY.

Prerequisite, Education 1 or Psychology 1-2 and preferably one other course in Educational Psychology.

A graduate course treating intensively of the fundamental facts of educational psychology. This course is designed for those who intend to major in educational psychology and for all those who wish a thorough grounding in the psychological principles of education. *Fall and winter quarters.* Professor Jordan.

126abc. FOUNDATIONS OF EDUCATION IN THE SOUTH.

This is a research course in modern educational practices and institutions and is open only to those advanced students who have had Education 26, or Education 36, or its equivalent. Various educational agencies will be studied through investigations, reports, and conferences. *Two hours a week, fall, winter, and spring quarters.* Professor Knight.

140. SEMINAR IN EDUCATION. Thesis Course.

This is a course of strictly graduate grade in which there will be taken up such work as is necessary for each student in connection with the writing of his degree thesis. It is intended for those students whose graduate major is in Education, but students whose thesis topics are closely related to Education are invited to attend and to take part in the discussions. The class will meet for two hours each week through the year. *Two hours a week, every quarter.* Professors in the School of Education.

151. PRINCIPLES OF SECONDARY EDUCATION.

A systematic course for graduate students, intended primarily for those who have not had Education 51. This course will embrace a study of the American high school, its evolution, organization, administration, functions, and problems. It is designed primarily for high school principals and graduate students who are looking forward to high school principalships. Textbooks, lectures, readings, and reports. A term paper will be required of each student before credit for the course will be allowed. *Five hours a week, spring quarter.* Professor Walker.

152. PHILOSOPHY OF HIGH SCHOOL TEACHING.

The object of this course is twofold: (a) to develop on the part of the student a sound philosophy of teaching such as will be in accord with the best thought of modern times, and (b) to develop an adequate understanding of current techniques. Students will be expected to acquaint themselves through extensive reading with all conceptions of education, discussions of educational values and statements of aims, purposes, and objectives which have influenced instruction in the secondary school. *Five hours a week, summer quarter.* Professor Mosher.

170. PROBLEMS IN THE TEACHING OF ENGLISH IN SECONDARY SCHOOLS.

A course intended for graduate students who have not had Course 70 or for others who have had some experience in teaching English in high schools. It will include an intensive study of the essential elements involved in the teaching of English and investigations of special problems in this field. At the beginning of the term each student will be required to select a problem for investigation approved by the instructor and to write a term paper embodying the results of his research. *Five hours a week, summer quarter.* Professor Farrar.

178. PROBLEMS IN THE TEACHING OF MATHEMATICS.

This course is designed to meet the needs of advanced students who have taught or are preparing to teach mathematics. The aim is to bring the student in contact with the literature on the subject of the teaching of mathematics through reading and to bring about an understanding of the problems which the teacher of mathematics faces, together with their solution, through lectures and class discussions. A term paper will be one of the requirements. *Five hours a week, summer quarter.* Professor Munch.

180. PROBLEMS IN THE TEACHING OF NATURAL SCIENCE IN THE SECONDARY SCHOOLS.

This course is designed to meet the needs of advanced students who have taught or are preparing to teach natural science. The aim is to bring the student in contact with the literature on the subject of the teaching of natural science through reading, and to bring about an understanding of the problems which the teacher of natural science faces, together with their solution, through lectures and class discussions. A term paper will be one of the requirements. *Five hours a week, summer quarter.* Professor Preston.

## DEPARTMENT OF ELECTRICAL ENGINEERING

PARKER HAYWARD DAGGETT, JOHN EMERY LEAR, Professors.

The Department of Electrical Engineering offers courses leading to the degree of Master of Science in Electrical Engineering. The requirements for the degree are in general the same as for the degree of Master of Arts and the prescribed courses may be found on page 33. Admission to candidacy for this degree presupposes the completion of the regular four-year course of this University leading to the degree of Bachelor of Science in Electrical Engineering. In the case of students from other technical schools of recognized standing certain substitutes may be accepted in lieu of the specific requirements for the bachelor's degree here.

The degree may ordinarily be obtained in one year after the conferring of the bachelor's degree, but in certain cases, where the preliminary training of the candidate has been insufficient, two years may be necessary.

With the opening of the new laboratories in the Phillips Building the department is able to offer excellent advantages for advanced work in laboratory investigation and engineering design. The laboratories comprise a total of nearly seven thousand square feet of floor space divided into a large dynamo laboratory containing over fifty generators, motors, and transformers; a standardization laboratory equipped with a wide range of precision standards for both direct and alternating current measurements; a well equipped photometric laboratory; a radio laboratory, and a special research laboratory equipped with a complete General Electric oscillograph outfit.

All of these laboratories are supplied with direct and alternating current power by means of a plug and socket system of connections, eight wires running from a large slate switchboard in the main laboratory to sub-panels located conveniently in the smaller rooms.

The University Power Plant offers excellent additional facilities for commercial testing and economic study of an advanced nature.

Through the generosity of Captain Isaac Edward Emerson, of Baltimore, the department possesses a very fine library of well-chosen text reference-books in both electrical and mechanical engineering, as well as files of the leading electrical engineering journals, American and foreign, some of which are complete to date.

Investigations already undertaken or in contemplation include the end-ring leakage reactance of squirrel-cage induction motors, current wave-shapes in the three-wire generator, automatic signaling for local battery telephone systems, brush drop phenomena, and resistance of coils at radio frequencies.

### Courses for Graduates and Advanced Undergraduates

64abc. ALTERNATING-CURRENT MACHINERY AND POWER TRANSMISSION. Prerequisite, Engineering 63abcs and Mathematics 4Eabc. A thorough study of the theory of the alternator, transformer, synchronous motor, synchronous converter, induction motor and generator, and the various types of single phase commutator motor; the electrical principles involved in long distance power transmission, with an introduction to the treatment of long lines by means of hyperbolic functions. *Five hours a week, fall, winter, and spring quarters.* Credit, 3 courses. Professor Daggett.

84abc. DYNAMO DESIGN. Corequisite, Engineering 63abc.

Electrical, mechanical, and economic questions involved in the design of electrical machinery; the effect of the design constants on the proportions and operation of machines. Each student will be required to make complete calculations for a d.c. generator or motor, a transformer, and an alternator. Reference book: Gray. *Two lecture and four laboratory hours a week, fall, winter, and spring quarters.* Credit, 2 courses. Professor Lear.

85a. ELECTRIC CIRCUITS. Prerequisite, Engineering 63abc and Mathematics 4Eabc or equivalent.

A mathematical study of the fundamental phenomena in the electric, magnetic, dielectric and thermal circuits, emphasizing the circuital relations common to all. Considerable attention will be devoted to the application of complex quantities to alternating current circuits. *Three hours a week, fall quarter.* Credit, ⅓ course. Professor Daggett.

85b. ELECTRICAL MEASUREMENTS. Prerequisite, Engineering 85a.

Theory, calibration, and use of instruments for the measurement of current, potential difference, power, and energy; bridge methods of measuring resistance, inductance, and capacitance; instrument transformers; magnetic measurements; dielectric tests; cable testing. Textbook: Laws. *Three hours a week, winter quarter.* Credit, ⅓ course. Professor Daggett.

85c. COMMUNICATION ENGINEERING.

A study of the fundamentals involved in the transmission of intelligence by telegraph, telephone, and radio; local and central office equipment for manual and machine switching systems; elements of telegraph and telephone transmission; laws of oscillatory circuits; radio transmission; study of the electron tube as detector, amplifier, and oscillator. *Three hours a week, spring quarter.* Credit, ⅓ course. Professor Daggett.

### Courses for Graduates

164a. ELECTRIC TRANSIENTS.

The mathematical theory of the phenomena of the transient state met with in the operation of electric circuits and machines; training in the technique of the oscillograph by the taking of a large number of oscillograms of char-

acteristic transient phenomena. *Laboratory fee, $10.00.* Credit, 1 course. Professor Daggett.

164b. HYPERBOLIC FUNCTIONS APPLIED TO TRANSMISSION PROBLEMS.

Use of hyperbolic functions of complex variables in the calculation of long distance transmission systems. Power relations in long lines; design of artificial lines. Credit, 1 course. Professor Daggett.

164c. DESIGN OF TRANSMISSION SYSTEMS.

Economic principles involved in the preliminary layout; insulation and lightning protection; sag of conductors; mechanical design of poles and towers. Credit, 1 course. Professor Daggett.

184abc. ELECTRICAL ENGINEERING RESEARCH AND DESIGN.

The solution of one or more definite problems in some particular field of electrical engineering. The work of this course will be outlined, as far as possible, to suit the needs of the individual student, and will consist of original investigations, designs, or the economic study of some existing electric power plant. Credit, 1 to 3 courses. Professors Daggett, Lear.

## DEPARTMENT OF ENGLISH

JAMES FINCH ROYSTER, FREDERICK HENRY KOCH, NORMAN FOERSTER, JOHN MANNING BOOKER, ADDISON HIBBARD, GEORGE COFFIN TAYLOR, WILLIAM FLINT THRALL, HOWARD MUMFORD JONES, Professors.

ALMONTE CHARLES HOWELL, GREGORY LANSING PAINE, WILLIAM DOUGALD MACMILLAN, III, Associate Professors.

RUSSELL POTTER, HUBERT CROUZE HEFFNER, Assistant Professors.

*LOUIS BOOKER WRIGHT, Instructor.

The Department of English offers to graduate students work in the following fields: (1) research leading to advanced degrees, with training afforded by specialized courses in literature and language; (2) preparation for teaching English; (3) special study of the drama, including dramatic composition and training for work in community drama.

1. Intensive study and research are made effective through advanced lecture courses and the seminars, through the resources of a well-equipped library, and through the stimulus of association with men who are actively interested in research. The library is especially strong in the field of Old and Middle English, in the literature of the sixteenth and seventeenth centuries, and in dramatic literature. Besides its share of the annual library appropriation, the department has the income from the Armfield Fund, which is applied exclusively to the purchase of books for advanced study. Several special appropriations have been made in the last few years, and several important collections have been added. A recent gift has placed in the library a distinctive collection (three hundred and fifty titles) of incunabula.

2. In addition to the advanced courses, which afford opportunity for gaining that sound and accurate knowledge that is the first essential of good teaching, the attention of teachers of English and of those who are preparing for such work is directed toward the development of an effective method. Such students have an opportunity to observe the methods of teaching and administration employed in the large undergraduate courses in English. Certain experiments in teaching these courses are now being tested; graduate students may observe these experiments and discuss them with the instructors.

*Absent on leave on the Guggenheim Foundation, 1928-1929.

### Requirements for Advanced Degrees

Candidates for advanced degrees in the Department of English must have completed, before admission to candidacy, a sufficient number of undergraduate courses in English to constitute a major. The courses elected by a candidate for the master's degree must include English 131, one course dealing with the language or literature before Shakespeare, and two courses in a field chosen for intensive study. All the courses may be chosen from the Department of English; or a minor may be chosen from some other department in the Division of Languages and Literatures, or, in special cases, from a department in some other division. The plan of work as a whole must be closely unified, and no department may be chosen as a minor unless the candidate has previously completed, as an undergraduate, an amount of work in that department sufficient to constitute an undergraduate minor. Advanced courses in the Department of Comparative Literature may, with the approval of the special committee directing a student's work, be counted as a part of the English major.

A reading knowledge of at least one foreign language is required for the degree of Master of Arts.

For the degree of Doctor of Philosophy the same general procedure is followed, except that after the first year of study less attention is paid to credit gained for courses and more stress is put upon independent work.

### Courses for Graduates and Advanced Undergraduates

40. ENGLISH LITERATURE OF THE RENAISSANCE.

A survey of the literature of the Elizabethan and Jacobean periods, exclusive of the drama. The poetry of the period, particularly that of Edmund Spenser, is stressed. *Five hours a week, fall quarter.* Professor Thrall.

43. THE ELIZABETHAN DRAMA.

A study of English drama from the beginnings to about the year 1600. Open only to students who have had one of the following: English 37, 38, 40, 42, or an equivalent course. (Given in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Taylor.

44. THE ELIZABETHAN DRAMA.

A study of English drama from 1600 to 1642. Open only to students who have had one of the following: English 37, 38, 40, 42, or an equivalent course. (Given in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Taylor.

45. MILTON.

The works of Milton are studied in the light of the life, times, and culture of the poet, with some consideration of the problems involved in such a study. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Taylor.

46ab. SHAKESPEARE: HISTORICAL AND CRITICAL PROBLEMS.

The works of Shakespeare are studied with emphasis upon the historical and critical problems which they present. Open to those students who have had one of the following courses or an equivalent course: English 37, 38, 40, 42, 43, 44. (Given in 1930-1931 and in alternate years. See English 43, 44.) *Five hours a week, fall and winter quarters.* Professor Taylor.

47. ENGLISH LITERATURE, 1616-1700.

The non-dramatic literature of the period. (Given in 1929-1930 and in alternate years. See English 75.) *Five hours a week, fall quarter.* Professor Howell.

48. ENGLISH LITERATURE, 1700-1780.
The non-dramatic literature of the period. (Given in 1929-1930 and in alternate years. See English 113.) *Five hours a week, winter quarter.* Professors Jones, MacMillan.

51. ENGLISH LITERATURE, 1780-1830.
A survey of English literature of the romantic period with especial attention to the greater poets. *Five hours a week, spring quarter.* Professor Jones.

63. AMERICAN LITERATURE, 1870-1900.
(Given in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professors Jones, Paine.

64. THE ROMANTIC MOVEMENT IN AMERICAN LITERATURE.
(Given in 1930-1931 and in alternate years.) *Five hours a week, winter quarter.* Professors Foerster, Paine.

65. EARLY AMERICAN LITERATURE.
A survey of the literature of the colonial, revolutionary, and earlier national periods before Poe. *Five hours a week, fall quarter.* Professor Paine.

68. COMPARATIVE DRAMA.
A general survey of the drama and the theatre from Aeschylus to Ibsen. The development of dramatic literature is studied through representative plays (in translation) of the leading European dramatists. *Five hours a week, winter quarter.* Professor Koch. (The course is the same as Comparative Literature 68.)

69. NINETEENTH CENTURY DRAMA.
A study of representative English plays in the nineteenth century. Particular attention is paid to the Celtic Renaissance. Consideration is given to the beginnings of a new folk drama in America. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Koch.

71. MODERN DRAMA.
A study of representative plays of recent times, beginning with Ibsen. Special attention is given to the function of the drama in interpreting modern thought and changing social conditions. (Given in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Koch. (The course is the same as Comparative Literature 71.)

75. RESTORATION AND EIGHTEENTH-CENTURY DRAMA.
A study of the drama from 1660 to 1800. (Given in 1930-1931 and in alternate years. See English 47.) *Five hours a week, fall quarter.* Professors Jones, MacMillan.

78. LITERARY CRITICISM.
The principles that have animated classical, romantic, and realistic literature. *Five hours a week, spring quarter.* Professor Foerster. (The course is the same as Comparative Literature 78.)

81. OLD ENGLISH: INTRODUCTORY COURSE.
A study of Old English grammar and syntax. A considerable amount of Old English prose is read. *Five hours a week, winter quarter.* Professor Royster.

83. MIDDLE ENGLISH: CHAUCER.
Previous training in Old or Middle English is not a fixed prerequisite. The work of the course will consist chiefly of a reading and discussion of Chaucer's works, with some consideration of Chaucer's language. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Royster.

85. MEDIEVAL ROMANCE IN ENGLISH.
A survey of medieval romance and romance materials in English literature, with particular attention to the Arthurian tradition. *Five hours a week, spring quarter.* Professor Thrall.

**Courses Primarily for Graduates**

101. STUDIES IN OLD ENGLISH LITERATURE: BEOWULF. Prerequisite, English 81.
(Given in 1930-1931 and in alternate years.) *Five hours a week, fall or spring quarter.* Professor Royster.

102. STUDIES IN MIDDLE ENGLISH LITERATURE.
The main purpose of the course is to acquaint the student with the social, political, and religious background of medieval English. A fuller study will be made of the historical and philological relations of Middle English than in English 83. (Given in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Royster.

105. MIDDLE IRISH.
This course is the same as Celtic 105. (See Department of Romance Languages.) (Given in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Holmes.

110. SEMINAR: STUDIES IN ELIZABETHAN LITERATURE.
Research in special problems in Elizabethan literature, with special emphasis on Shakespeare during one quarter. Open to those who have had one of the following courses or an equivalent: English 40, 42. (Given in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Taylor.

112. SEMINAR: STUDIES IN SEVENTEENTH CENTURY LITERATURE.
Research in special problems in the literature and thought of the seventeenth century. Open to those who have had one or more of the following courses or an equivalent: English 40, 45, 47. (Given in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Howell.

113. SEMINAR: STUDIES IN EIGHTEENTH CENTURY LITERATURE.
Special problems in the literary and intellectual movements of the eighteenth century. Open only to students who have had English 47, 48, 75, or an equivalent course. (Given in 1930-1931 and in alternate years. See English 48.) *Five hours a week, winter quarter.* Professor Jones.

117. SEMINAR: STUDIES IN NINETEENTH CENTURY ROMANTICISM IN ENGLAND.
Wordsworth and Coleridge: the English and Continental aspects of their thought and art. *Five hours a week, fall quarter.* Professor Foerster. (The course is the same as Comparative Literature 117.)

118. SEMINAR: STUDIES IN NINETEENTH CENTURY ROMANTICISM IN AMERICA.
*Five hours a week, winter quarter.* Professor Foerster. (This course is the same as Comparative Literature 118.)

120ab. SEMINAR: STUDIES IN VICTORIAN LITERATURE.
Research in special problems in the works of Carlyle, Tennyson, and Browning. These writers are studied in successive years. 1929-1930: Browning. Open to those who have had English 55 or the equivalent. *Five hours a week, winter and spring quarters.* Professor Booker.

*125. PLAY WRITING, ADVANCED COURSE.
A practical course in playwriting with a study of the development of dramatic theory. Emphasis is placed on the native tradition and present-day life with which the student is familiar. The Carolina Playmakers furnish a working laboratory in production for the plays written in the course. *Five hours a week, fall quarter.* Professor Koch.

*126. PLAY WRITING, ADVANCED COURSE.
The principles of dramatic construction and practice in writing one-act plays. *Five hours a week, winter quarter.* Professor Koch.

*127. PLAY WRITING, ADVANCED COURSE. Practice in writing the full length play with demonstrations of plays written in the course. *Five hours a week, spring quarter.* Professor Koch.

131ab. SEMINAR: METHODS.
The principles and methods of the study of English with a series of simple problems in bibliography and literary history. Required of all candidates for the A.M. and Ph.D. degrees. *Three hours a week, fall and winter quarters.* Professor Royster.

140. SPECIAL READINGS.
Reading in a special field under the direction of a member of the department.

141. SPECIAL RESEARCH.
Research in a special field under the direction of a member of the department.

Attention is called to the courses in philology and advanced literary study offered in the departments of Classics (Latin 30, Mediæval Latin; Latin 104, Latin Epigraphy; Latin 105, Latin Paleography), Comparative Literature, Germanic Languages (German 111, Introduction to Comparative Philology: German 101, Gothic, etc.), and Romance Languages (French 121-122-123, Old French; French 125, Provencal; Spanish 121-122, Early Spanish; Italian 12, 13, Dante; etc.)

## DEPARTMENT OF GEOLOGY

COLLIER COBB, WILLIAM FREDERICK PROUTY, Professors.

JOEL HOWARD SWARTZ, Associate Professor.

GERALD RALEIGH MACCARTHY, Assistant Professor.

To men entering the profession of geology opportunities for useful employment are open in teaching, in state and national bureaus and surveys, in mining, in investigating oil fields, in working various economic geologic deposits, and in soil investigation. Preparation for this work may be had through the regular college course, with geology as the major study throughout the course, and the addition of field work in vacation and work in the Graduate School for one or more years. It may also be obtained through a course in the School of Applied Science leading to the degree of Bachelor of Science in Geology; and this should in every case be followed by work leading to the degree of Master of Science as outlined below.

The work of the graduate student specializing in geology should be, in large measure, the investigation of problems in the field, and the working out of many of the details in the laboratory. At the present time the following lines of investigation are being pursued by members of the Department of Geology: mineral analysis of seashore sands and their value as a source of

*Students who elect these courses cannot expect to complete the requirements for the master's degree in one year.

economic minerals; shore-line processes in relation to harbor development; a study of the geology of the Serpentine marble deposits of Cardiff, Md.; structure of the Monroe Shale Belt; economic and structural character of the slates of eastern Tennessee; correlation of the Chattanooga Black Shale to other black shales of southeastern United States; extent and character of the loess deposits of the Mississippi Valley; characteristics of Triassic deposits of North Carolina and structural relations to other Triassic areas of eastern North America; studies in the origin of continents and mountain-building; field work in geo-physical methods of prospecting; investigation of the foraminifera of the coastal plain of North Carolina; structure and economic character of the Holston marble northeast of Knoxville, Tenn.; structure of the Paleozoic rocks of the Salem-Roanoke, Va., area; and an investigation of possible grain-producing soils.

### Graduate Degrees in Geology

The course leading to the degree of Master of Science in Geology is open to students who have graduated with the degree of Bachelor of Science in Geology in this University, and to students who have completed the equivalent of a course as prescribed by the University. The course consists of a special research in some one branch of geology, pursued throughout the year, and six weeks in field-work in the summer under the direction of a member of the graduate faculty, followed by the completion of the investigation during the fall term. These researches constitute six full courses for the master's degree. In addition to this major, the candidate must complete three approved courses in one or more of the following departments: chemistry, physics, civil engineering, zoölogy, or botany.

For the degree of Doctor of Philosophy the same procedure is followed, except that after the first year of study less attention is paid to credit gained for courses and more stress is put upon independent work.

### Geological Laboratories and Museum

The geological laboratories occupy the New East Building, recently rebuilt. The laboratories are well supplied with minerals, rocks, thin rock sections, materials for study of economic geology, lantern slides, maps, charts, microscopes, and instruments for advanced work.

The geological museum on the first floor of New East contains large collections of minerals, rocks, and fossils. It is open daily to the student body and the public.

### Courses for Graduates and Advanced Undergraduates

11-12. ECONOMIC GEOLOGY. Prerequisite, Geology 1-2, 3-4, Chemistry 1-2.

Lectures, laboratory work, and reports. During the fall quarter the nonmetallic minerals will be studied. The metallic minerals will be considered in the winter quarters. *Five hours a week, lectures and laboratory, fall and winter quarters. Laboratory fee, $3.50 a quarter.* Professor Prouty.

13. PETROLOGY. Prerequisite, Geology 1-2, 3-4, Chemistry 1-2.

Laboratory work on rocks; a study of the origin, classification, and distribution of rocks. *Five hours a week, lectures and laboratory, spring quarter. Laboratory fee, $3.50.* Professor Prouty.

14. PETROGRAPHY. Prerequisite, Geology 1-2, 3-4, Chemistry, 1-2.

Lectures, laboratory work on the miscroscopic physiography of the rock-forming minerals; optical mineralogy and the theory of light as applied to the polarizing microscope; minerals as observed in thin rock sections. *Five hours a week, lectures and laboratory, spring quarter. Laboratory fee, $3.50.* Professor Prouty.

15-16. STRUCTURAL AND FIELD GEOLOGY. Prerequisite, Geology 1-2.
Lectures, with laboratory, field work, problems, and conferences. The first quarter deals with structural geology and map interpretation; the second quarter with geological note taking, surveying, map making, and field practice. *Five hours a week, lectures and laboratory, winter and spring quarters. Laboratory fee, $3.50 a quarter.* Professor Prouty.

17. OIL GEOLOGY. Prerequisite, Geology 15-16.
Lectures, laboratory work, and reports. A study of the origin, distribution, and accumulation of petroleum, with special relation to the oil fields of North America; methods of prospecting for oil, recovery of oil, the valuation of oil properties. *Five hours a week, lectures and laboratory, spring quarter. Laboratory fee, $3.50.* Professor Prouty.

24-25. ORIGIN AND NATURE OF SOILS. Prerequisite, Geology 1-2, 3-4, Chemistry 1-2.
Lectures, field work, laboratory work, and theses. The course is given primarily for men who wish to enter the state or federal soil surveys or to engage in farming. Students in this course are expected to keep Saturday open for field work. *Five hours a week, lectures and laboratory, winter and spring quarters. Laboratory fee, $2.50 a quarter.* Professor Cobb.

51-52-53. ADVANCED FIELD WORK AND SPECIAL RESEARCH IN GEOLOGY AND GEOGRAPHY.
Problems and work adapted to the special needs of the student. For graduates and for specially prepared seniors. Students in this course are expected to keep Saturday open for field work. These courses may be continued under the same numbers for more than one year as the subject advances, credit being given for each repetition. *Five hours a week, fall, winter, and spring quarters.* Professors Cobb, Prouty, Swartz, MacCarthy.

61. ADVANCED CRYSTALLOGRAPHY.
This course includes a detailed consideration of the nature of crystals and crystalline substances, the use of both contact and reflecting goniometer, and crystal drawing. Open to students who have had Chemistry 1-2 and Geology 3-4. *Five hours a week, lectures and laboratory, spring quarter. Laboratory fee, $3.50.* Professor MacCarthy.

71-72-73. ADVANCED PALEONTOLOGY.
A study of the classification and generic and specific determination of the invertebrata, chiefly fossil. *Five hours a week, lectures and laboratory, fall, winter, and spring quarters. Laboratory fee, $3.50 a quarter.* Professor Swartz.

74-75-76. ADVANCED PALEONTOLOGY.
A study of the anatomy, classification, and generic and specific determination of the higher invertebrata, chiefly fossil. (Given in 1928-1929, and in alternate years.) *Five hours a week, lectures and laboratory, fall, winter, and spring quarters. Laboratory fee, $3.50 a quarter.* Professor Swartz.

81-82-83. ADVANCED HISTORICAL GEOLOGY. Prerequisite, Geology 1-2.
A study of the principles of historical geology and stratigraphy, the history of stratigraphic geology, the origin of the earth, and the geography, life, and geologic events of the Archaeozoic, Proterozoic, and Paleozoic eras of the earth's history. *Five hours a week, fall, winter, and spring quarters.* Professor Swartz.

91-92. SUMMER FIELD COURSE IN GEOLOGY. Prerequisite, Geology 1-2.

A six weeks' course to be given in North Carolina and bordering states. In this course economic, structural, and stratigraphic geology and geological mapping will be emphasized. For details of course consult Bulletin of Geology Courses, The University of North Carolina. This course will coincide with the scheduled six weeks' summer school course. *Equivalent of five hours a week for two quarters.* Professors Cobb, Prouty, Swartz, MacCarthy.

93-94. SUMMER FIELD COURSE IN GEOLOGY.

This course is similar to 91-92 but is to be given in alternate years with 91-92 and in a different type of geological area.

### Courses for Graduates

104-105-106. SPECIAL RESEARCH IN GEOLOGY AND GEOGRAPHY.

The student is expected to devote six weeks to work in the field, accompanied by the instructor, and to work up his results during the first quarter of the college year. The entire research constitutes three courses. These courses may be continued under the same numbers for more than one year as the subject advances, credit being given for each repetition. *Equivalent of five hours a week, fall, winter, and spring quarters.* Professors Cobb, Prouty, Swartz, MacCarthy.

107-108-109. SPECIAL RESEARCH.

Special research in economic geology, in historical geology, in paleontology, petrology and petrography, and in geography, two quarters of which must be taken as a seminar course. These courses may be continued under the same numbers for more than one year as the subject advances, credit being given for each repetition. *Equivalent of five hours a week, fall, winter, and spring quarters.*

The geological seminar meets weekly for the review and discussion of current geological literature, and for the presentation of original papers.

## DEPARTMENT OF GERMANIC LANGUAGES

WALTER DALLAM TOY, KENT JAMES BROWN, Professors.

ERNST CHRISTIAN PAUL METZENTHIN, Associate Professor.

The courses for advanced undergraduates and graduates offered by the German Department are designed to meet the needs of three classes of students: those whose interest in language and literature prompts them to pursue their German studies beyond the undergraduate stage; those who are preparing to teach in schools and private academies; and those who purpose to adopt the study of Germanic languages as a profession.

For all of these classes the department offers courses covering different periods of the language and literature. The dialect courses are intended primarily for those who will specialize in Germanic languages.

The Department of Germanic Languages and Literatures is laying the foundation for a library adequate for research in special fields; notably at present for problems relating to Goethe, for the dramatic work of Kleist, Grillparzer, and Hebbel, for the history of the German novel, and for the old Saxon epic, the *Heliand.*

The critical apparatus is carefully chosen. There are complete bibliographies and full sets of the leading journals. All scholarly editions of important monuments of literature from the Gothic period to the present time are available, as well as many valuable monographs. The latter embody the results of research both in philology and literature.

### Requirements of Candidates for Advanced Degrees

In case the preparation of candidates is, in the judgment of the department, not adequate, the right is reserved to supplement this training by preparatory courses.

Candidates for the master's degree should have, in addition to their special work, a general acquaintance with the history of the German language and literature. Of candidates for the doctor's degree there will be expected a more detailed acquaintance with the history of the language and literature in addition to the special investigation of some particular period.

In all cases the candidates should have a command of colloquial German and to this end some residence in Germany is most desirable.

### Courses for Graduates and Advanced Undergraduates

41-42. *GOETHE'S LIFE AND WORKS. Prerequisite, five courses in German. This course may be elected only after consultation with the instructor.

Lectures, readings, reports. *Gœtz von Berlichingen, Werthers Leiden, Tasso, Gedichte, Wilhelm Meister, Hermann und Dorothea, Briefe, Dichtung und Wahrheit. Five hours a week, two quarters.* Professor Brown.

43-44. *GOETHE'S FAUST. Prerequisite, German 21 and 22, or 25 and 26. This course may be elected only after consultation with the instructor.

Goethe: *Faust,* Parts I and II. *Five hours a week, two quarters.* Professor Toy.

45. *GERMAN DRAMA IN THE NINETEENTH CENTURY. Prerequisite, German 21 and 22, or 25 and 26.

Kleist, Grillparzer, Hebbel, Ludwig, Hauptmann. Reading, lectures, reports. *Five hours a week, one quarter.* Professor Brown.

### Courses Primarily for Graduates

101. *GOTHIC. Prerequisite, German 21 and 22, or 25 and 26.

Braume's *Gotische Grammatik*: selected parts of Paul's *Grundriss der Germanischen Philologie.* Introduction to Germanic Philology. *Five hours a week, one quarter.* Professor Toy.

103. *OLD HIGH GERMAN. Prerequisite, German 21 and 22, or 25 and 26.

Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch. Five hours a week, one quarter.* Professor Toy.

107. *MIDDLE HIGH GERMAN. Prerequisite, German 21 and 22, or 25 and 26.

Middle High German grammar. Wide reading. *Five hours a week, one quarter.* Professor Brown.

109. *THE ROMANTIC SCHOOL IN GERMANY.

*Five hours a week, one quarter.* Professor Brown.

111. *INTRODUCTION TO COMPARATIVE PHILOLOGY. Prerequisite, one classical and one modern foreign language.

A study of the theories of the origin and development of human speech; primitive languages (American Indian); classification and history of languages; peculiarities of the Semitic branch (Hebrew); the Indo-European branch; classical languages; Baltic-Slavonic and Romance group (especially French); Germanic family: Gothic, Old Saxon, Old English, Old High German. This course may be elected only after consultation with the instructor. *One quarter.* Professor Metzenthin.

---

*NOTE.—Courses 41-42, 43-44, 45, 101, 103, 107, 109, 111, 113, 115, will be given if they are desired by a sufficient number of students. In any case the department reserves the right to withdraw a course for which the registration is very small.

113. *GERMANIC PHILOLOGY. Prerequisite, advanced English and German.

After a survey of the Indo-European family of languages the prehistoric Primitive Germanic language is explained and from it, as their source, the various Germanic dialects are traced and their historical developments discussed. Stress will be laid on Gothic, Anglo-Saxon, Old High German, and Old Saxon; the minor dialects, Frisian, Dutch, and the North Germanic branch, will be included. An introduction to the reading and interpretation of Germanic manuscripts will be given. *One quarter.* Professor Metzenthin.

115. OLD SAXON.

Introduction to the grammar and syntax of the Old Saxon dialect. Comparison with Gothic, Old High German and Old English. Study of "Heliand" and "Genesis"—including the characteristics of the Heroic Epic and its alliterative form—as well as of the minor Low German prose documents of the 9th and 10th centuries, based on Otto Basler, *Altsachsisch* (Freiburg, 1923). *Five hours a week, one quarter.* Professor Metzenthin.

117. HISTORY OF GERMAN LITERATURE FROM 1500 to 1750.

Stress is laid on the religious (polemic, lyric) literature of the German reformation in the 16th century, with Luther as the spiritual center and as the founder of the modern German language; on the overwhelming influence of foreign literature during the 17th, and on the reaction in the first half of the 18th century. *Five hours a week, spring quarter.* (Alternates with Ger. 115.) Professor Metzenthin.

## DEPARTMENT OF HISTORY AND GOVERNMENT

JOSEPH GREGOIRE DE ROULHAC HAMILTON, HENRY MCGILBERT WAGSTAFF, WILLIAM WHATLEY PIERSON, JR., ROBERT DIGGS WIMBERLY CONNOR, FRANK PORTER GRAHAM, EDWARD JAMES WOODHOUSE, MITCHELL BENNETT GARRETT, WALLACE EVERETT CALDWELL, Professors.

KEENER CHAPMAN FRAZER, FLETCHER MELVIN GREEN, Assistant Professors.

### The Library

The library resources for graduate study in History at the University of North Carolina offer exceptionally rich materials in two fields: those of North Carolina history and the Civil War period. The University has had the good fortune to acquire the collection of Dr. Stephen B. Weeks, which contains more than 10,000 titles of books, pamphlets, newspapers, and manuscripts relative to the history of North Carolina. This collection, together with other works possessed by the library, particularly those placed there by the North Carolina Historical Society, and with the manuscripts of the North Carolina Historical Commission, to which students may have access, must be regarded by historians as one of the important collections of the United States. The Kenan fund for materials on the Civil War period has enabled the library to secure a constantly increasing collection, which is especially complete in materials on military history. Through the generosity of Mr. John Sprunt Hill, of Durham, N. C., the library has been able to acquire further rare material on North Carolina history. Recent additions, including a partially complete set of Hansard reports and an important group of books, documents, and pamphlets have been made respectively in English and in Hispanic-American history. The Peabody Collection provides a basis for the study of international law and diplomacy. In the Kidder, Clark, Bridgers, and Howard collections the University library has a noteworthy group of newspaper materials.

### History Seminar Room

The history seminar room, equipped with tables and filing cases, is a repository of important newspaper collections. It is the headquarters for graduate students in History and is situated within easy access to the stacks.

### Publications

Under the direction of the department there is published the *James Sprunt Historical Studies*. Established by the late Dr. James Sprunt, of Wilmington, N. C., the publication has twenty volumes. The contents, it may be noted, have in the main been relative to the North Carolina state and colonial history and government, but by recent action its scope has been enlarged to embrace general history and political science. Its pages have been open to students as well as to specialists.

## HISTORY

### Courses for Graduates and Advanced Undergraduates

31. THE ORIENT AND EARLY GREECE.
An advanced course in the history of the Bronze Age in the Mediterranean, the beginning of civilization in Egypt, Babylonia, Syria and Palestine, and Crete, and the history of their development down to the time of the Persian Empire. Attention will be given to the hieroglyphics and cuneiform scripts, to economic conditions, governments and law, artistic and literary achievements, and religion. (Offered in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Caldwell.

32. GREECE: THE CLASSICAL PERIOD.
A history of the classical period of Ancient Greece: the Homeric Age, the Expansion of the Hellas, the Renaissance of the Aegean, the Fifth and Fourth Centuries to the death of Alexander. Particular attention will be given to the growth of democracy, social and economic aspects, artistic, literary, and religious developments. (Offered in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Caldwell.

33. HELLENISTIC GREECE AND THE ROMAN REPUBLIC.
A survey of the world into which Rome entered, the political, economic, and social conditions of the Eastern Mediterranean, Hellenistic art, literature, and religion, the establishment and growth of the Roman Republic, Roman expansion throughout the Mediterranean, the growth of Roman culture, the Roman Revolution, and the foundation of the Empire. (Offered in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professor Caldwell.

34. THE ROMAN EMPIRE AND THE EARLY MIDDLE AGES.
A survey of history from Augustus to Charlemagne; the organization and administration of the Roman Empire, social, economic, and religious conditions and developments, the collapse of ancient civilization, the Germanic invasions, the foundation of feudalism and the Medieval Church, Charlemagne, and the Empire. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Caldwell.

35. MEDIÆVAL EUROPE: CHARLEMAGNE TO THE RENAISSANCE.
A brief survey of the political history of mediæval Europe and an intensive study of institutional, economic, and cultural conditions, the Empire, the Church, feudalism, the manor, the cities, the universities, and the cathedrals. *Five hours a week, winter quarter.* Professor Caldwell.

36. THE RENAISSANCE.

Introduction to the Renaissance. The establishment of modern European culture. Lectures on the history, science, fine arts, literary scholarship, and literature of the Renaissance in Italy, France, Germany, the Netherlands, and England. (Offered in 1930-1931.) *Five hours a week, fall quarter.* Professors Holmes (Chairman), Garrett, Bernard, Taylor, Lyons, Adams, Thrall. (The course is the same as Comparative Literature 57.)

37. THE PROTESTANT REVOLT.

An intensive study of religious, political, intellectual, and economic conditions on the eve of the Protestant Revolt, of the movements led by Luther, Zwingli, Calvin, Knox, and Henry VIII, and of the Catholic Reformation. (Offered in 1929-1930.) *Five hours a week, spring quarter.* Professor Garrett.

39. ENGLAND IN THE NINETEENTH CENTURY.

The purpose of this course is to effect an intensive treatment of a relatively short period of English History, that from 1815 to 1915. The course will develop England's national and imperial story, her international relations and her contributions to the history of the age. Lectures and readings. *Five hours a week, spring quarter.* Professor Wagstaff.

40. THE FRENCH REVOLUTION.

An intensive study of the causes, events, and results of the French Revolution. (Offered in 1929-1930.) *Five hours a week, fall quarter.* Professor Garrett.

42. THE NAPOLEONIC PERIOD.

A detailed study of the chief events and movements of the Napoleonic period. Particular attention will be paid to the immediate effects of the period on the states surrounding France and on the permanent results of the period on Europe. (Offered in 1929-1930.) *Five hours a week, winter quarter.* Professor Garrett.

43. RISE OF DEMOCRACY AND NATIONALISM IN MODERN EUROPE.

An intensive study of the period of restoration and reaction, the revolutions of 1830 and 1848, the rise of socialism, the unification of Italy and of Germany, France under Louis Philippe, the Second French Republic, and Napoleon III. (Offered in 1930-1931.) *Five hours a week, fall quarter.* Professor Garrett.

44. RECENT AND CONTEMPORARY EUROPEAN HISTORY.

A study of the recent history of France, Germany, Italy, Austria-Hungary, and Russia, the causes of the Great War, the chief events of the war, the treaties of peace, the attempt to organize the world, the world after the war, and recent movements in Europe. (Offered in 1930-1931.) *Five hours a week, spring quarter.* Professor Garrett.

45. THE RISE OF ABSOLUTISM IN EUROPE.

A study of the rise of absolutism in Europe. A detailed study of the Thirty Years War, France under Henry IV, Richelieu, Mazarin, and Louis XIV, the rise of Prussia, Sweden from Gustavus Adolphus to the death of Charles XIII, the decline of Poland and Turkey, and the development of Russia to the death of Peter the Great. (Offered in 1930-1931.) *Five hours a week, winter quarter.* Professor Garrett.

46. THE NEAR EAST.

A study of the rise and decline of Turkey, the development of international rivalries in the Near East, the rise of the Balkan States, the revolution in Turkey, the Balkan Wars, the Great War in the Near East, and the rebirth of Turkey. (Offered in 1929-1930.) *Five hours a week, spring quarter.* Professor ————.

51. THE AMERICAN COLONIES IN THE SEVENTEENTH CENTURY.

A general survey of the European background of American society and institutions and the rival territorial claims of the colonizing nations; followed by an intensive study of the influences and motives behind English colonization in America, the founding of England's continental colonies, their political, social, and economic development, and their relations to each other and to the British Empire as a whole. Lectures, readings, and reports. (Offered in 1929-1930.) *Five hours a week, fall quarter.* Professor Connor.

52. THE AMERICAN COLONIES IN THE EIGHTEENTH CENTURY.

A general survey of the colonies as a whole at the opening of the eighteenth century, followed by an intensive study of their social, economic, and political development, immigration, conquest and westward expansion, their imperial relations and part in international rivalries, constitutional controversies and development of colonial self-government, intercolonial relations, revolution and independence, federal relations and the formation of the American Union. Lectures, readings, and reports. (Offered in 1930-1931.) *Five hours a week, fall quarter.* Professor Connor.

53. THE FEDERAL PERIOD (1783-1815).

An intensive study is made of the government under the Articles of Confederation, the formation and adoption of the Federal Constitution, the nature of the Union, the launching of the government, Jeffersonian democracy, the westward movement, and the Second War for Independence. Text-book, lectures, readings, and reports. (Offered in 1930-1931.) *Five hours a week, fall quarter.* Professor Green.

54. THE ANTE-BELLUM PERIOD (1815-1860.)

A social, economic, and political study of the period—the westward movement, states' rights philosophy, Jacksonian democracy, development of Nationalism, controversy over Negro slavery, the rest of Southern rights, and the causes of the stroke for Southern independence. Text-book, lectures, readings, and reports. (Offered in 1929-1930.) *Five hours a week, fall quarter.* Professor Green.

55. SECESSION AND CIVIL WAR.

Beginning with a rapid survey of the states' rights theory and of the secession movement before 1860, the course deals with the important constitutional, political, and economic aspects of the Civil War in the United States. Lectures, readings, and reports. (Offered in 1930-1931.) *Five hours a week, winter quarter.* Professor Hamilton.

56. THE RECONSTRUCTION PERIOD.

A course dealing with the constitutional, political, social, and economic aspects of the period from the close of the Civil War in 1865 to the restoration of home rule in the South in 1877. Lectures, readings, and reports. (Offered in 1929-1930.) *Five hours a week, winter quarter.* Professor Hamilton.

57. RECENT AMERICAN HISTORY, 1876-1898.

The history of the United States from 1876 to 1898. In this course emphasis will be placed upon the influence of the Civil War and Reconstruction upon subsequent American history; the war amendments in theory and practice; business and politics; the Granger movement; the currency question; the tariff legislation; the trust problem; foreign relations; the Spanish-American War and its results; party politics; political dissent and interpretation of democracy. Lectures, text-books, and readings. (Offered in 1929-1930.) *Five hours a week, spring quarter.* Professor Pierson.

58. RECENT AMERICAN HISTORY, 1898-1920.

Continuation of History 57. A course dealing with the political, economic, social, and diplomatic history of the United States from 1898 to 1920. Conservatism, moderation, and radicalism in politics and economics; social legislation; American imperialism and increased participation in international relations; the World War and the problems of peace. Lectures, text-books, and readings. (Offered in 1930-1931.) *Five hours a week, spring quarter.* Professor Pierson.

59. NORTH CAROLINA, 1663-1789.

General survey of the settlement of North Carolina and its territorial expansion; the origin and development of its political institutions; the influences affecting its growth and development; immigration and the development of social and economic life; political and constitutional controversies; intercolonial and imperial relations; revolution and independence; the adoption of a constitution and organization of the state government; federal relations and formation of the Federal Union. Lectures, readings, and reports. *Five hours a week, winter quarter.* Professor Connor.

60. NORTH CAROLINA, 1789-1900.

General survey of conditions at the close of the 18th century; origin and development of political parties; sectional controversies; political and constitutional development; education, internal improvements, and railroads; federal relations; the slavery controversy; secession, civil war and reconstruction; restoration of home rule; the rise of Populism; the era of fusion; "white supremacy"; recent political, educational, and industrial development. Lectures, readings, and reports. *Five hours a week, spring quarter.* Professor Connor.

63. HISTORY OF THE WEST.

A study of the westward movement of civilization from 1763 to the opening of the 20th century in the area now comprising the United States; the conditions and processes of migration into the various areas; and the social, economic, and political influence of the frontier. Textbook, lectures, readings, and reports. (Offered in 1929-1930.) *Five hours a week, winter quarter.* Professor Green.

64. THE FRONTIER IN AMERICAN HISTORY.

A study of the general significance of the frontier in American civilization; the problems of the West, its contributions to American democracy, Western ideals, and the reaction of the frontier influences upon the East. Lectures, readings and reports. (Offered in 1930-1931.) *Five hours a week, winter quarter.* Professor Green.

65. AMERICAN ECONOMIC HISTORY.

This course will deal with the economic materials, institutions, conflicts, and transitions in the history of the United States from its origin as a part of the British economic empire to its development as one of the economic powers in the present world, with some regard for the social and political implications involved in this development. *Five hours a week, spring quarter.* Professor Graham.

66. SOCIAL AND EDUCATIONAL HISTORY OF THE UNITED STATES. (Education 37.)

The social and educational institutions and practices of the United States are traced through: (a) the period of transplanting of European institutions; (b) the period of modifications of institutional life to meet new conditions; and (c) the period of development of a social and an educational system of free common schools, high schools, and higher and technical education in harmony with the political and social ideals and institutions of America. Textbook, lectures, investigations, and reports. *Five hours a week, fall or spring quarter.* Professor Knight.

68. INTER-AMERICAN RELATIONS.
A course concerned with the diplomatic relations developed between the states of the Western Hemisphere from 1810 to the present. The chief interest will be in the relations of the United States and the Hispanic-American countries. In the course such topics will be treated as the problems of recognition, the Monroe Doctrine, expansion, intervention, "headship" of the United States, Pan-Americanism, arbitration, trade and cultural relations. Lectures, readings, and reports. *Five hours a week, spring quarter.* Professor Pierson.

70. HISPANIC AMERICAN HISTORY: The Colonial Period and the Wars of Independence. Seniors and Graduates.
In this course a general survey will be made of Spanish and Portuguese America from the establishment of colonial settlements through the wars of independence. A study of the transplantation of Hispanic civilization in language, customs, religion, trade, and political institutions; Indian relations; labor and social conditions; education and industry; the causes and events of the struggles for independence. Lectures and readings. *Five hours a week, winter quarter.* Professor Pierson.

71. HISPANIC-AMERICAN HISTORY: Development of Nationality in South America. Seniors and Graduates.
The modern history of Argentina, Brazil, Chili, Uruguay, Paraguay, Peru, Bolivia, and Ecuador. Attention will be directed to the establishment of these republics, the evolution of their political theory, the struggle for political stability, the exploitation of resources, the diplomatic and commercial relations with the United States and Europe, the international problems of South America, the contemporary progress in politics and society. Lectures and readings. (Offered in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Pierson.

72. HISPANIC-AMERICAN HISTORY: Hispanic North America and the Caribbean Countries. Seniors and Graduates.
Emphasis in this course will be placed upon the same general factors as in History 71. The diplomatic and commercial relations of the United States and Mexico, the insular republics, the Central American countries, and Colombia, Panama, and Venezuela will receive special attention. Lectures and readings. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Pierson.

### Courses Primarily for Graduates

100abc. THE HISTORY OF NORTH CAROLINA.
A seminar course in the social, economic, and political history of North Carolina. The course continues throughout the year, a weekly conference being held for the presentation of reports and discussions. *Conference, one hour a week, fall, winter, and spring quarters.* Professor Connor.

106abc. THE HISTORY OF CONGRESS.
A seminar course devoted to the investigation of a selected period in the history of the Congress of the United States. *Conference, one hour a week, fall, winter, and spring quarters.* Professor Hamilton.

110abc. ANCIENT HISTORY.
A seminar in some phase of Ancient History. *Conference, one hour a week, fall, winter, and spring quarters.* Professor Caldwell.

113abc. MODERN EUROPEAN HISTORY.
A seminar in some phase of the Napoleonic period. *Conference, one hour a week, fall, winter, and spring quarters.* Professor Garrett.

116abc. HISTORY OF THE UNITED STATES, 1783-1860.
A seminar in some phase of the history of the United States, 1783-1860. *Conference, one hour a week, fall, winter, and spring quarters.* Professor _____.

120. PRELIMINARIES OF THE AMERICAN REVOLUTION.
A study of the background and causes of the American Revolution. Lectures and reports. *Five hours a week, fall quarter.* Professor Connor.

141. SEMINAR COURSE.
A research course in a special field under the direction of a member of the department.

151ab. HISTORIOGRAPHY.
Lectures, conferences, readings. The first term will be concerned with methods of research, schools of interpretation, and the interrelation of history with the other social sciences. The second term will be devoted to the history and bibliography of history. Required of all graduate students in history and government. *Fall and winter quarters, credit one course.* (This course, with Professor Caldwell as chairman, is given coöperatively by the department.)

## GOVERNMENT

### Courses for Graduates and Advanced Undergraduates

30. THE ELEMENTS OF POLITICAL SCIENCE.
A general course in which a study is made of the principles of political science and of the important theories respecting the nature, origin, forms, and ends of the state and of government. An examination of the literature of the subject will be made, supplemented by students' reports on selected political theorists. Lectures, textbooks, and readings. *Five hours a week, fall quarter.* Professor Pierson.

34. THE CONSTITUTION OF THE UNITED STATES.
An elementary course in constitutional law covering by means of lectures, textbooks, and cases the fundamental principles of constitutional interpretation and practice in the United States. *Five hours a week, fall quarter.* Professor Hamilton.

35. THE GOVERNMENT OF ENGLAND.
The objective in this course is a knowledge of the development and operation of the English government. Local, national, and imperial aspects of England's governmental practice will receive attention. Resemblances and contrasts between her government and that of our own country will be pointed out for the practical lessons which the parallel supplies. Lectures and readings. (Offered in 1929-1930.) *Five hours a week, spring quarter.* Professor Wagstaff.

36. AMERICAN MUNICIPAL GOVERNMENT.
An historical survey of the development of governmental structure, theory, and functions in American municipalities, and careful analysis of existing municipal conditions, with special attention to city and town government in North Carolina. Each student will make an intensive study of his own or of some other city or town. *Five hours a week, fall quarter.* Professor Woodhouse.

37. AMERICAN MUNICIPAL ADMINISTRATION.
Special study of the principles and problems of administration in American municipal corporations, of such functions as police, public education, charities and correction, local improvements, public health, finances, with emphasis on

city and town administration in North Carolina. Each student will select and study exhaustively a municipal problem in one municipality. *Five hours a week, fall quarter.* Professor Woodhouse.

38. AMERICAN STATE GOVERNMENT.
A study in the principles, organization, and administrative methods of state government. In connection with the course will be a special study of the government of North Carolina. Lectures, readings, and reports. *Five hours a week, winter or spring quarter.* Professor Connor.

40. INTERNATIONAL LAW.
A study will be made of the rules observed by the states of the world concerning their relations in peace and in war. Lectures and the preparation of typical cases by the students. *Five hours a week, fall quarter.* Professor Frazer.

41. INTERNATIONAL RELATIONS.
The problems of nationalism and internationalism, of imperialism, and the settlement of international conflicts will be considered in this course. It is designed to introduce the student to the basic facts of world politics. Lectures, readings, and reports. *Five hours a week, winter quarter.* Professor Frazer.

42. GOVERNMENT AND ADMINISTRATION OF EUROPEAN CITIES.
A general consideration of principles and methods of social control in the municipalities of Great Britain, France, and Germany, with some attention to those of other nations. Comparisons with American conditions. *Five hours a week, spring quarter.* Professor Woodhouse.

43. COUNTY GOVERNMENT AND ADMINISTRATION.
A study of the forms of organization, the functions, and the operation of county government in the United States and especially in North Carolina, in their historical development but with special emphasis on present conditions and tendencies and on possible improvements. Each student will be required to study, as extensively and as intensively as possible, the government and administration of one county, preferably his home county, and to put his results in essay form. Regular class discussion will be based on the best general texts, the North Carolina Constitution, Statutes and Supreme Court decisions, and on special studies of individual counties already made and being made in the University. A fair minimum of required reading will be assigned and wider reading encouraged. *Five hours a week, spring quarter.* Professor Woodhouse.

46. POLITICAL THOUGHT OF THE EIGHTEENTH CENTURY.
An analysis of political thought and philosophy, 1750-1800. Emphasis will be placed on the study of the philosophical ideas of the American and French revolutions. Lectures and reports. *Five hours a week, winter quarter.* Professor Pierson.

47. DEVELOPMENT OF THE ENGLISH CONSTITUTION.
A general course surveying the origin and development of the Constitutional machinery of the British monarchy. Emphasis will be laid on the successive Constitutional landmarks from the Norman Conquest to the Parliament Act of 1911. Lectures, textbooks, and readings. (Alternates with Government 35. Offered in 1930-1931.) *Five hours a week, spring quarter.* Professor Wagstaff.

48. AMERICAN DIPLOMACY.
The course will be concerned with a survey of the diplomatic relations of the United States from the period of the American Revolution to the World

War. Particular attention will be directed to the development of American foreign policies and American contributions to international public law. Lectures and reports by students. *Five hours a week, spring quarter.* Professor Frazer.

### Courses Primarily for Graduates

100abc. AMERICAN POLITICAL THEORY.

A seminar course respecting the political philosophy that has been developed in the United States. In the fall quarter the political theory of the colonial period and the American Revolution will be studied; in the winter quarter attention will be given to the theories associated with the formation of the Constitution and its early interpretation, the nature of the Union, and the slavery dispute; in the spring quarter the political theory of the Civil War and the contemporary United States will be considered. Lectures, readings, and reports. *Two hours a week, fall, winter, and spring quarters.* Professor Pierson.

106abc. MODERN INTERNATIONAL RELATIONS.

Seminar in international relations. An analysis will be made of the major problems of international relations. Emphasis will be placed upon the elements of nationalism and internationalism, imperialism, and the settlement of international disputes. *Two hours a week, fall, winter, and spring quarters.* Professor Frazer.

110-111-112. SEMINAR ON STATE AND LOCAL GOVERNMENT.

Intensive studies of various functions, organs, and problems of public administration in states of the United States and in their subdivisions. Comparison of various attempts to reorganize state administrative systems. *Two hours a week, fall, winter, and spring quarters.* Professor Woodhouse.

141. SEMINAR COURSE.

A research course in a special field under the direction of a member of the department.

## DEPARTMENT OF MATHEMATICS

ARCHIBALD HENDERSON, JOHN WAYNE LASLEY, JR., ALLAN WILSON HOBBS, Professors.

ARTHUR SIMEON WINSOR, ERNEST LLOYD MACKIE, EDWARD TANKARD BROWNE, JOE BURTON LINKER, Associate Professors.

The subject of mathematics constitutes the foundation upon which the general subject of engineering, in its broader aspects, solidly rests. This is true of such subjects as electrical, chemical, and mining engineering; but more especially, all work in scientific design of structures and in civil engineering depends upon minute and detailed knowledge of mathematical laws and principles.

On the pedagogical side, many of the courses, in particular those in pure mathematics, are designed for the student purposing to become a teacher in the schools, or a professor in college or university. In the light of the advance of mathematical science, and the wide ramifications of the more modern branches, many courses are offered to enable the student to specialize along a number of different lines. A group of courses permits specialization in the general subject of geometry; another group of courses deals with the broad division of analysis; a third grouping permits specialization in mechanics.

### The Resources of the Department

In Phillips Hall, thoroughly modern in construction and adequate in equipment, are located the departments of Mathematics, Physics, Civil, Electrical,

and Mechanical Engineering. This concentration of allied departments in a single building affords exceptional advantages. The lecture halls and seminar rooms, departmental offices convenient for consultation, well-equipped testing rooms and laboratories, and commodious, well-lighted quarters for students in drawing—all are found beneath a single roof. In this building is a group departmental library, rich in works in mathematics, pure and applied, physics, and engineering—civil, electrical and mechanical. The department now occupies quarters on the second floor of the new wing of Phillips Hall, with class, office, and conference rooms.

### Requirements for Advanced Degrees

The courses in the major subjects are to be selected from the courses enumerated and described below, reference being had to the particular degree sought. The courses may be grouped under three main divisions: analysis, geometry, and mechanics. The grouping and order of the courses will be arranged by conference between professor and student, the controlling factors being the previous preparation and training of the student and the particular degree sought.

The courses in the minor subjects, as a rule, will be chosen from the general fields of the allied and related sciences, such as physics, astronomy, and engineering—civil, electrical, and chemical; however, if desired, all of the work may be done in the major subjects.

For the candidate for an advanced degree, reading knowledge of French and German is desirable; indeed, in the case of the candidate for the degree of Doctor of Philosophy, familiarity with French and German scientific terminology and facility in the reading of foreign journals is required.

### Courses for Graduates and Advanced Undergraduates

50. THEORY OF EQUATIONS. Prerequisite, Mathematics 5.

Indispensable for students intending to prosecute studies in the higher branches of pure mathematics. Such subjects as the solution of equations of higher degree, transformations, determinants, elimination, invariants and covariants, and symmetric functions are treated in detail. The student is afforded a survey of the general problem and the basic principles of the formation, handling, and evolution of equations. *Five hours a week, winter quarter.* Professor Browne.

51. DIFFERENTIAL EQUATIONS. Prerequisite, Mathematics 5 or 4Ea.

This is a course both for students intending to specialize in mathematics and for students in advanced engineering—civil, electrical, and chemical. Among the subjects treated are singular solutions, applications to mechanics, geometry, and physics, linear equations with both constant and variable coefficients, equations involving more than two variables, partial differential equations, and spatial forms. *Five hours a week, winter quarter.* Professor Browne.

52. SYNTHETIC PROJECTIVE GEOMETRY. Prerequisite, Mathematics 5.

A geometric account of the fundamental notions of projective geometry: one-to-one correspondence, dimensionality, projective correspondence between forms of one and two dimensions, poles and polars, involution, projective and metric theory of conics. (Summer 1929 and alternate years.) Professor Lasley.

53. PROJECTIVE HOMOGENEOUS CO-ORDINATES AND THEIR APPLICATIONS. Prerequisite, Mathematics 5.

A study of the general homogeneous coördinates of forms of one, two, three, and four dimensions; cross ratio and its properties; ideal elements; duality; projective correspondence; transformation of coördinates; the elements of line geometry. *Five hours a week, fall quarter.* Professor Lasley.

54. ANALYTIC PROJECTIVE GEOMETRY. Prerequisite, Mathematics 53.

The projective theory of binary forms; the conic as a rational curve; the conic as a ternary form; the conic from the viewpoint of the theory of correlations; functional determinants and invariants; selected topics from higher geometry. *Five hours a week, winter quarter.* Professor Lasley.

55. ANALYTIC GEOMETRY OF SPACE. Prerequisite, Mathematics 5.

Spatial relations are treated from the analytic standpoint. Deals with quadric surfaces, envelopes, foci, quadriplanar and tetrahedral coördinates, developable surfaces, curves in space, curvature of surfaces, higher surfaces, etc. (1930-1931 and alternate years.) *Five hours a week, spring quarter.* Professor Henderson.

56abc. GRAPHICAL ANALYSIS. Prerequisite, Mathematics 5 or equivalent.

A study of alignment charts and of equations determined from empirical data, with a brief treatment of the method of least squares. *Three laboratory hours a week, fall, winter, and spring quarters.* Professor Linker.

59. ADVANCED CALCULUS. Prerequisite, Mathematics 5.

This course completes and rounds out the subject as given in Mathematics 5. Stress upon rigor in demonstration. Designed to meet the particular needs of the class, e.g., problem course on study of special functions. Thorough knowledge of calculus is the aim of the course. (1930-1931 and alternate years.) *Five hours a week, fall quarter.* Professor Mackie.

60. DYNAMICS. Prerequisite, Mathematics 12 and 51.

Differential equations of motion, equations of orbits, D'Alembert's principle, motion of a rigid body. (1930-1931 and alternate years.) *Five hours a week, winter quarter.* Professor Hobbs.

61. VECTOR ANALYSIS. Prerequisite, Mathematics 60.

A study of some of the general principles of mechanics in the language of vectors. (1930-1931 and alternate years.) *Five hours a week, spring quarter.* Professor Hobbs.

70. ADVANCED DIFFERENTIAL EQUATIONS. Prerequisite, Mathematics 51.

Linear equations with constant coefficients, with variable coefficients. Exact equations and equations of the second order, with geometrical and physical applications. Partial differential equations, with classic types. (1929-1930 and alternate years.) *Five hours a week.* Professor Henderson.

### Courses Primarily for Graduates

100. THEORY OF FUNCTIONS OF A REAL VARIABLE. Prerequisites, Mathematics 50, 59.

The real number system from the standpoints of Cantor and Dedekind, elementary theory of point sets, limits, series, implicit functions, Riemann and Lebesque integrals. (1929-1930 and alternate years.) *Five hours a week, winter quarter.* Professor Mackie.

101. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE. Prerequisites, Mathematics 50, 51, 59.

Complex numbers, differentiation and integration, conformal mapping, linear fractional transformations, single and multiple valued functions. (1930-1931 and alternate years.) *Five hours a week, winter quarter.* Professor Mackie.

102. HIGHER PLANE CURVES.
A course dealing with plane curves, particularly conics; cubics and quartics; polarity, Plücker formulas, curves of Hesse, Steiner, and Cayley; classification of cubics, intersections of curves, singularities of curves, unicursal curves. (1929-1930 and alternate years.) *Five hours a week, spring quarter.* Professor Lasley.

103. THE THEORY OF DIFFERENTIAL EQUATIONS. Prerequisite, Mathematics 51.
A study of differential equations from the point of view of continuous groups. (1930-1931 and alternate years.) *Five hours a week, fall quarter.* Professor Hobbs.

104. THEORY OF NUMBERS. Prerequisite, Mathematics 50.
An elementary course in the study of the properties of the rational integers, including the study of the question of divisibility, greatest common divisor of two or more integers, solution of simple congruences, quadratic residues, quadratic reciprocity law, representation of integers by quadratic forms, equivalence of quadratic forms, etc. (1929-1930 and alternate years.) *Five hours a week, fall quarter.* Professor Browne.

105. DIFFERENTIAL GEOMETRY. Prerequisite, Mathematics 51 and 54.
A study of the metric differential geometry of curves, surfaces, and curves on surfaces, systems of curves defined by differential equations, surfaces given by two quadratic differential forms. (1929-1930 and alternate years.) *Five hours a week, spring quarter.* Professor Lasley.

106. INTRODUCTION TO THE THEORY OF RELATIVITY. Prerequisite, Mathematics 12 and 51.
In this course the essential features of the special and the general relativity theories of Einstein are set forth from the mathematical point of view. Particular study is made of the Lorentz transformation, the theory of tensors, the absolute differential calculus, and the three crucial tests of the theory. (1929-1930 and alternate years.) *Five hours a week, spring quarter.* Professor Henderson.

107. ADVANCED RELATIVITY THEORY.
Restricted relativity, with applications to physical and electrical problems. General relativity and gravitation. Geodesics and curvature in space-time. Cosmological speculations as to a finite, unbounded universe. Theories of Einstein and DeSitter. (1929-1930 and alternate years.) *Five hours a week, fall quarter.* Professor Henderson.

108. MODERN HIGHER ALGEBRA. Prerequisite, Mathematics 50.
Polynomials and their fundamental properties, determinants, theory of linear dependence, lineal equations, matrices, invariants, bilinear and quadratic forms. (1930-1931 and alternate years.) *Five hours a week, winter quarter.* Professor Browne.

109. ELEMENTS OF NON-EUCLIDEAN GEOMETRY. Prerequisite, Mathematics 52.
The subject is treated chronologically. The contributions of Saccheri, Bolyai, Lobachewsky, Riemann, Cayley, Klein are studied, analyzed, and compared. (1930-1931 and alternate years.) *Five hours a week, fall quarter.* Professor Henderson.

111. CALCULUS OF VARIATIONS. Prerequisite, Mathematics 100.
A study of various kinds of minimizing problems, determining functions which minimize certain definite integrals. Isoperimetric problems. Necessary

conditions for an extreme as deduced by Euler, Weierstrass, Legendre, and Jacobi, and conditions sufficient to ensure such an extreme. (1929-1930 and alternate years.) *Five hours a week, spring quarter.* Professor Mackie.

112. PROJECTIVE DIFFERENTIAL GEOMETRY. Prerequisites, Mathematics 53 and 105.

A study of the projective properties of curves and ruled surfaces by means of the invariants and covariants of systems of homogeneous differential equations. (1930-1931 and alternate years.) *Five hours a week.* Professor Lasley.

113. INTRODUCTION TO THE THEORY OF FINITE GROUPS. Prerequisite, Mathematics 50.

Deals with the theory of substitutions in general, and as applied to the algebraic equation. Simple and compound groups, transitivity and primitivity. Cyclic and linear groups, linear fractional substitutions, etc. Numerous applications in algebra and geometry. *Five hours a week, winter quarter.* Professor Henderson.

141. SEMINAR.

Reading and research in Mathematics conducted by members of the department.

## DEPARTMENT OF PHILOSOPHY

HENRY HORACE WILLIAMS, Professor.

STEPHEN ALBERT EMERY, Assistant Professor.

Attention is called to the Graham Kenan Fellowship in Philosophy, which yields $1,500 annually, and may be held by one person for several years. The department will be interested in hearing from any one who desires to pursue the study of Philosophy until some positive and lasting result is reached.

### Courses for Graduates and Advanced Undergraduates

10-11-12. LOGIC AND CIVILIZATION. The aim of this course is to incite the student to begin a philosophy of life for himself. It is a combination of logic and philosophy, and will show the development in logic and the corresponding steps in philosophy. The purpose is to exhibit the application of logic and to show the fundamental lines along which philosophy develops. *Five hours a week, fall, winter and spring quarters.* Professor Williams.

14. THE LOGIC OF SCIENCE. The course will consider briefly the mutual relations of common sense, science, and logic; the general nature of scientific inference; the basal concepts and modes of reasoning in mathematics, physics, chemistry, and biological science. Material for discussions and occasional reports will be drawn from selected portions of Bosanquet's *Logic,* Hobson's *Domain of Natural Science,* J. S. Mill's *System of Logic,* Pearson's *Grammar of Science,* Poincare's *Foundations of Science,* and A. Wolf's *Essentials of Scientific Method. Five hours a week, fall quarter.* Professor Emery.

16. RECENT AESTHETIC. Study of typical current theories of beauty. Research in the method and contribution of anthropology, experimental psychology, art-criticism, and systematic speculation. Reading in Santayana, Croce, Bergson, and Bosanquet. *Five hours a week, fall quarter.* Professor ————.

17. THE PHILOSOPHY OF ART. The place of art among human interests. Its relation to morals, science, religion, play, and dream. The problems of a standard of taste and the significance of medium, interpretations of the ugly and the comic. Consideration of the important historical theories of beauty with special emphasis upon their illustration in the arts. *Five hours a week, winter quarter.* Professor ————.

18. THE PHILOSOPHY OF ART. A continuation of Course 17, which may be taken independently. *Five hours a week, spring quarter.* Professor ————.

20. ETHICS. The aim of the course is to gain some insight into points of view rather than knowledge of detail. Problems for class discussion will arise in attempting to discover the subject matter and methods of ethics, its position within philosophy as a whole, various meanings of the fundamental concepts of *right* and *good,* and the ultimate criteria of ethical values. For representative theories the student will be referred to sections of Aristotle's *Nicomachian Ethics,* Kant's *Fundamental Principles of the Metaphysic of Morals,* and J. S. Mill's *Utilitarianism. Five hours a week, spring quarter.* Professor Emery.

50. SURVEY OF THE HISTORY OF PHILOSOPHY. Rapid survey of the development of speculative thought from the Sophists to Bergson. Emphasis is laid upon the human and cultural rather than on the dialectical aspects of philosophy. *Five hours a week, winter quarter.* Professor ————.

### Courses Primarily for Graduates

121. THE INDIVIDUAL AND THE STATE.
A study of political theory, with special reference to underlying metaphysics and psychology. *Three hours a week, fall quarter.* Professor Emery.

135. SPECIAL READINGS.
Reading in a special field under the direction of a member of the department.

140-141-142. SEMINAR IN PHILOSOPHY.
Conducted by the department. Hours and subjects are arranged at the beginning of the year.

## DEPARTMENT OF PHYSICS

OTTO STUHLMAN, JR., Professor.

EARLE KEITH PLYLER, Associate Professor.

The Department of Physics is offering a cycle of courses which extends over a period of two years, the object of which is to provide a thorough knowledge of the underlying principles of the subject in its various ramifications. The aim is to present the subject in its modern aspect with sincerity and thoroughness, requiring at the same time sufficient work in the laboratory to provide the necessary first-hand contact with the material under consideration.

The student majoring in Chemistry, Mathematics, Geology, and allied fields will find here a group of subjects from which to choose a minor that will help him interpret his specialty and develop a broader point of view.

The recent addition to Phillips Hall, in which the Department of Physics occupies the first and ground floors of the west wing, has made it possible to extend its research facilities so that advanced students may occupy separate research laboratories in which they may pursue their investigations. These laboratories are equipped with gas, water, dark rooms, and inter-communicating electric power facilities.

Special attention is given to research in ultra-violet spectra and electron phenomena. Recent additions in equipment have made it possible to pursue special problems in infra-red absorption and radiation.

The department library, located on the third floor of Phillips Hall, is in possession of complete files of the leading journals, handbooks, and monographs on modern physics.

In order to pursue graduate work successfully a reading knowledge of German and French is required of all candidates for advanced degrees who major in Physics.

### Courses for Graduates and Advanced Undergraduates

5. HEAT AND THERMODYNAMICS. Prerequisite, Physics 1-2, Mathematics 4.

Lectures, problems, and laboratory work. *Four lecture and two laboratory hours a week, winter quarter. Laboratory fee, $2.50.* Professor Plyler.

6. MECHANICS AND WAVE MOTION. Prerequisite, Physics 1-2, Mathematics 4.

Lectures, problems. *Five hours a week, winter quarter.* Professor Stuhlman.

7. MODERN ELECTRICAL THEORY. Prerequisite, Physics 1-2, Chemistry 1.

Lectures; the electron theory, atomic structure, radio-activity, etc. *Five hours a week, spring quarter.* Professor Stuhlman or Professor Plyler.

8. ADVANCED ELECTRICITY AND MAGNETISM. Prerequisite, Physics 1-2, Mathematics 4.

An introduction to the mathematical treatment of these subjects. *Four lecture and two laboratory hours a week, winter quarter. Laboratory fee, $2.50.* Professor Plyler.

9. OPTICS. Prerequisite, Physics 1-2.

A treatment of the fundamental principles of geometrical and physical optics; lectures, problems, and laboratory work. *Four lecture and two laboratory hours a week, fall quarter. Laboratory fee, $2.50.* Professor Stuhlman.

10. INTRODUCTION TO MATHEMATICAL PHYSICS. Prerequisite, Mathematics 51 or its equivalent.

(Offered in 1930 and alternate years.) *Five hours a week, spring quarter.* Professor Stuhlman.

12. ADVANCED GENERAL LABORATORY.

This course affords an opportunity for further training and experimental study in physics not given in other courses. *Six laboratory hours a week, every quarter. Laboratory fee, $2.50.* Professors Stuhlman, Plyler.

13. X-RAY TECHNIQUE: BIOPHYSICS. Prerequisite, Physics 1-2.

Laboratory work in the physical aspects of X-ray apparatus, technique of photographic and fluoroscopic roentgenology, with some applications to biophysical and engineering problems. *Two lecture and eight laboratory hours a week, spring quarter. Laboratory fee, $15.00.* Professor Stuhlman.

### Courses Primarily for Graduates

115. ATOMIC STRUCTURE. Prerequisite, Physics 7, Mathematics 4.

A critical survey of the experimental and theoretical evidence in various branches of physics for the present theories of the structure of atoms and molecules, the nature of magnetism, etc. A reading knowledge of German is required. *Five hours a week, fall, winter, or spring quarters.* Professor Stuhlman.

116. MATHEMATICAL THEORY OF ELECTRICITY AND MAGNETISM. Prerequisite, Mathematics 51.

General electrostatic theory; ideal electric fields; conditions with homogeneous and non homogeneous dielectrics; general laws of conduction; thermal effects; magnetostatic fields; electro-magnetic phenomena; electric waves. *Five hours a week.* Professor Stuhlman.

117. THEORY OF LIGHT. Prerequisite, Mathematics 51.
1. Geometrical optics. 2. Physical optics. 3. Optical properties of crystals and metals. 4. Magneto optics and radiation. A reading knowledge of French and German is required. *Five hours a week.* Professor Stuhlman.

118. THEORY OF RELATIVITY. Prerequisite, Mathematics 51.
A critical study of the experiments leading to the development of the theory of relativity; Einstein's work; study of contemporary articles on the subject. A reading knowledge of German is required. *Five hours a week.* Professor _____.

119. THEORY OF HEAT. Prerequisite, Mathematics 5.
Conductivity. Kinetic theory of gases. Change of state. Thermodynamics. Radiation and temperature. *Five hours a week.* Professor Plyler.

141. RESEARCH.
Intended for applicants for advanced degrees. Experimental work. Subject must be assigned or approved by the professor in charge. A reading knowledge of French and German is required. Professors Stuhlman, Plyler.

NOTE. Courses in advanced Analytic Mechanics are offered by the Department of Mathematics.

## DEPARTMENT OF PSYCHOLOGY

JOHN FREDERICK DASHIELL, HARRY WOLVEN CRANE, ENGLISH BAGBY, Professors.

The emphasis of the work in the Department of Psychology is primarily along the lines of interest in the science for its own sake; and students who are interested in the subject as an independent natural science are given opportunity and coöperation in research. In addition, the demand on the part of other fields for definite and reliable knowledge of human nature, especially in the various professional schools, amounts to a call for coöperation from this department; and some of the instruction and research are shaped with a view to supplying such assistance to education, medicine, commerce, sociology, etc.

The New West Building has been completely remodeled; and, with the exception of a portion of the third floor reserved for the Dialectic Literary Society, which has been housed in the building for many years, it has been rebuilt throughout to answer the needs of the Department of Psychology. On the first floor are located a lecture room, a classroom, a large class laboratory, two seminar rooms, and private offices. On the second floor are arranged a library, a classroom fitted with tables, a large class laboratory, three rooms for clinical examinations, an apparatus and supply room, a shop, and a private office. Space on the third floor is planned especially for research, the two ends of the building making room for seven small private rooms and an animal room, with a mezzanine room being especially built to be soundproof and lightproof. The building is piped throughout for water and for gas; and electric supplies of both alternating and direct current in low and high voltages are made available at numerous outlets in the different laboratories. The technical equipment is practically complete. It includes sufficient duplication of apparatus for the experimental work in the various undergraduate courses, a fairly complete stock of standard apparatus for training in experimental methods, and sufficient apparatus and funds for the prosecution of research along most of the recognized psychological lines. The departmental library includes all the technical journals published in English and a few in other languages. The supply of books is fairly complete.

A member of the department is psychopathologist to the State Board of Charities and Public Welfare, supervising the mental examination of abnormal cases throughout the state; and the properly interested and qualified graduate

student is given opportunities here. Psychological assistance is given by the department to educational interests in the state, especially on the sides of tests and measurements, mental hygiene, and problems in learning. It is hoped that resources will soon permit coöperation also with other lines of work in the state, particularly commercial, industrial, and legal.

The courses listed primarily for graduates are selected with the aim of providing such as will be intensive and extensive preparation in "pure" psychology. They are of a nature to be best fitted for those who wish to give themselves a thorough and sound purchase on psychology as their major subject as well as naturally to be recommended to students majoring in another department. Interests in applied psychology in its varied forms—educational, economic, social, medical, etc.—are well met by many of the courses listed for graduates and advanced undergraduates. Research work will ordinarily be done in connection with courses 102-103.

### Courses for Graduates and Advanced Undergraduates

22. THE PSYCHOLOGY OF LEARNING. Prerequisite, Psychology 1-2. An analysis of human training; its nature, means, and possibilities. A reading survey will be made of the outstanding experimental work on these lines. The aim will be to get an accurate and scientific notion of the subject, with possibilities of application to various fields of applied psychology, including education and industry. Readings, discussions, experiments. *Three lecture and four laboratory hours a week, spring quarter. Laboratory fee, $1.00.* Professor Dashiell.

25. ANIMAL PSYCHOLOGY. Prerequisite, Psychology 1-2. Development of mind in the animal. Study of behavior as analyzable into tropisms, reflexes, instincts, habits, learning capacities, etc. Comparisons between different phyla of animals and between animals and man. Texts, lectures, and experiments. *Five hours a week, winter quarter. Laboratory fee, $1.00.* Professor Dashiell.

26. CHILD PSYCHOLOGY. Prerequisite, Psychology 1-2. The development of behavior in the child. The chief subdivisions to be studied are the original behavior equipment, the growth and maturation of structure, the acquisition of habits, the development of capacity, and the formation of interests. Attention will be given to conflict of interests and mental hygiene. This course is the natural introduction to courses in educational psychology. Lectures, readings, and experiments with children. *Five hours a week, fall quarter. Laboratory fee, $1.50.* Professor Bagby.

35. ECONOMIC PSYCHOLOGY: INDUSTRIAL AND VOCATIONAL. Prerequisite, Psychology 1-2.

There will be two main divisions of the course, as follows: (1) The adjustment of the worker to his work—including industrial training, effects of incentive, monotony, and fatigue; motion study and mental hygiene in industry. (2) The selection of personnel for various kinds of work, with the industrial use of tests of intelligence and personality. An outline of vocational psychology will be given, and the psychology of salesmanship discussed. Lectures, experiments, readings. *Four lecture and two laboratory hours a week, spring quarter. Laboratory fee, $2.00.* Professor Bagby.

36. ECONOMIC PSYCHOLOGY: ADVERTISING. Prerequisite, Psychology 1-2.

An attempt is made to present systematically those aspects of psychology which will aid the advertiser more effectively to construct and present his advertisements. While aiming to give information of practical value, the emphasis is placed upon the establishment of a point of view which will be of

assistance in the development of a general technique on the part of the advertiser. *Four lecture and two laboratory hours a week, winter quarter. Laboratory fee, $2.00.* Professor Crane.

38. LEGAL PSYCHOLOGY. Prerequisite, Psychology 1-2.

The course is organized about some of the major problems of psychological nature with which the law is concerned; such as, the accuracy of testimony, the reliability of findings by juries, responsibility and criminal psychology, the effects of punishment, modes of detecting suppression of guilty knowledge. The aim is to obtain an accurate knowledge of the present status of each problem; and the method will be that of a natural science approach leading ultimately to implications of practical legal character. Readings, lectures, and experiments. *Five hours a week, spring quarter. Laboratory fee, $1.00.* Professor Dashiell.

40. PSYCHOLOGY OF PERSONALITY. Prerequisite, Psychology 1-2.

This course is a consideration of certain of the factors upon which the quality of human adjustments depends. Emphasis is placed upon emotional reactions as primary sources of motivation and an attempt is made to indicate the most effective methods of training and of retraining the various types of emotional reactions. *Five hours a week, fall quarter.* Professor Bagby.

45. ABNORMAL PSYCHOLOGY: FEEBLE-MINDEDNESS. Prerequisite, Psychology 1-2.

Presentation of the psycho-neural aspects of feeble-mindedness in general, and of the various types, together with their importance in relation to the problems of education, dependency, and delinquency. There will be discussion and demonstration of the various clinical methods of determination and classification of feeble-mindedness. (Given alternately with Psychology 47.) *Five hours (lectures and equivalent laboratory) a week, winter quarter. Laboratory fee, $1.00.* Professor Crane.

46. ABNORMAL PSYCHOLOGY: PSYCHONEUROSES AND PSYCHOSES. Prerequisite, Psychology 1-2.

A study is made of the more important deviations from the normally reacting and experiencing human organism. Attention is given to the sensory, imaginal, emotional, motor, etc., abnormalities and to the occurrence of these in the various psychoses. Brief surveys are given of the methods of clinical psychology and of psychotherapy. *Five hours (lectures and equivalent laboratory) a week, spring quarter. Laboratory fee, $1.00.* Professor Crane.

47. ABNORMAL PSYCHOLOGY: METHODS OF MENTAL EXAMINATION. Prerequisite, Psychology 1-2.

A presentation of the various psychological methods used in the clinical study of individuals. This includes a study of the methods used in determination of the presence or absence of specialized defects as well as the determination of level of intelligence. Lectures, experiments, readings. (Given alternately with Psychology 45.) *Four lecture and two laboratory hours a week, winter quarter. Laboratory fee, $2.00.* Professor Crane.

51, 52, 53. EXPERIMENTAL PROBLEMS.

To the student who finds himself especially interested in some particular problem of psychology, perhaps as growing out of the subject matter of one of the preceding courses, encouragement and opportunity are here offered for investigative study. May be elected any quarter, and for one, two, or three quarters. *One lecture and eight laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $2.00 a quarter.* Professors Dashiell, Crane, Bagby.

### Courses Primarily for Graduates

101. ADVANCED EXPERIMENTAL PSYCHOLOGY.
A training course in the technique of psychological experimentation and research, to acquaint the student both with methods and with typical forms of apparatus. A survey will be made of experimental technique in the study of the various motor, sensory, thinking, and emotional functions, including both introspective and behavioristic approaches. *One lecture and eight laboratory hours a week, fall quarter. Laboratory fee, $2.00.* Professor Dashiell.

102-103. RESEARCH IN PSYCHOLOGY. Prerequisite, Psychology 101.
Opportunity will be given for the experimental investigation of special problems along the line of the individual student's interests. The personal and material resources of the department are here especially offered. *Ten laboratory hours a week, winter and spring quarters. Laboratory fee, $2.00 a quarter.* Professors Dashiell, Crane, Bagby.

105. PHYSIOLOGICAL PSYCHOLOGY.
An intensive study is made. Emphasis is placed upon the neural mechanism as a basis of understanding both the mental and the reaction phenomena of psychology. *Five hours (lectures and equivalent laboratory) a week, fall quarter. Laboratory fee, $2.00.* Professor Crane.

106. CONTEMPORARY PSYCHOLOGICAL TENDENCIES.
A systematic survey of the more outstanding recent and contemporary movements in modern psychology. Readings assigned in the works of Wundt and Titchener, James, Hall, McDougall and Stout, Thorndike, Watson, Freud, Jung, Köhler, Koffka, and perhaps others. *Five hours a week, spring quarter.* Professor Dashiell.

108. SOCIAL PSYCHOLOGY.
Several relatively unrelated problems are treated in this course. The feeble-minded, the insane, and the criminal types are characterized, and suggestions are offered for the solution of the social problems involved. The immigration policy of the United States is critically studied from a psychological point of view. Typical mob reactions, especially lynching episodes, are analysed. Finally, a study is made of the conditions conducive to the development of national spirit and other forms of loyalty. *Five hours a week, winter quarter.* Professor Bagby.

The student is referred also to courses in Educational Psychology given by Professors Jordan and Trabue in the Department of Education, numbers 20, 43, 64, and 110, and in Neurology, Anatomy 6, given by Professor Mangum in the School of Medicine.

## DEPARTMENT OF ROMANCE LANGUAGES

WILLIAM MORTON DEY, STURGIS ELLENO LEAVITT, URBAN TIGNER HOLMES, JR., Professors.

HOWARD RUSSELL HUSE, NICHOLSON BARNEY ADAMS, ELISHA KENT KANE, Associate Professors.

JOHN CORIDEN LYONS, THOMAS JAMES WILSON, III, Assistant Professors.

### Department Regulations

All candidates for higher degrees are required to have a knowledge of Latin. This may be construed to mean an elementary knowledge in certain cases. Candidates for the degree of Master of Arts are strongly advised to have a reading knowledge of German, as well as of French. Those who intend to pursue the degree of Doctor of Philosophy are required to have this reading knowledge by the general regulations of the Graduate School.

Students who major in Spanish must choose French as their minor subject. Those who choose French as a major usually pursue their minor work in Spanish or Italian; they may, after consultation with the chairman, substitute Latin, Comparative Literature, or English.

Before the degree of Doctor of Philosophy will be awarded the candidate must have spent six months in the country of his major interest, three months of which must have been spent in work upon his thesis. This requirement is usually satisfied in two summers abroad.

### Library Facilities

The library is a subscriber to some fifty current periodicals in which space is given either wholly or in part to the Romance languages and literatures. The complete files of nearly all of these journals are in our possession. The collection of books is especially rich in Romance linguistics, Medieval French literature, French literature of the 16th and 19th centuries, and in Spanish literature of the 17th century and contemporary periods. The other periods are well represented. The collection also contains such important series as *Les Documents inédits de la France*, and the Champion edition of *Stendhal* (not yet completed). The Library is also purchasing photostat copies of early books and manuscripts. A photostating machine is owned by the University and is at the disposal of faculty and research students.

## FRENCH

### Courses for Graduates and Advanced Undergraduates

11. FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. Prerequisite, French 6.

A study of the period of Henry IV and Louis XIII. *Five hours a week, fall quarter.* Professor Wilson.

12. FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. Prerequisite, French 6.

This course will deal with the literature of the reign of Louis XIV. *Five hours a week, winter quarter.* Professor Wilson.

13. FRENCH LITERATURE OF THE EIGHTEENTH CENTURY. Prerequisite, French 6.

Voltaire, Montesquieu, Rousseau, les Encyclopédistes. A study of the literary movement of the century and of the origins of romanticism. (Offered in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professor Huse.

14. FRENCH PHONETICS. Prerequisite, French 5.

A detailed study of the French vowel and consonant sounds by the phonetic method. This course is required of candidates for the master's degree, and it should be elected by any one who intends to teach French. *Five hours a week, fall quarter.* Professor Dey.

15. THE FRENCH ROMANTIC MOVEMENT. Prerequisite, French 6.

French literature from 1800 to 1850, with special stress on the works of the romantic poets, Lamartine, Hugo, Vigny, and Musset. Lectures, reading, reports. *Five hours a week, fall quarter.* Professor Dey.

16. FRENCH LITERATURE SINCE 1850. Prerequisite, French 6.

A study of the later literary movements of the 19th century, with some emphasis on the contemporary period. Lectures, readings, reports. *Five hours a week, winter quarter.* Professor Dey.

18. THE FRENCH DRAMA. Prerequisite, French 6.
A rapid survey of the French drama from the beginning to the 19th century. *Five hours a week, spring quarter.* Professor Wilson.

19. THE FRENCH NOVEL. Prerequisite, French 6.
A study of the development of the novel in French. Lectures, readings, reports. (Offered in 1930-1931 and in alternate years.) *Five hours a week, winter quarter.* Professor Dey.

24. FRENCH LYRIC POETRY. Prerequisite, French 6.
A study of French lyric poetry, beginning with Villon. Lectures, readings, reports. *Five hours a week, spring quarter.* Professor Huse.

26. HISTORY OF THE FRENCH LANGUAGE. Prerequisite, French 6.
A general survey from the origins to the present day, with especial emphasis upon the period, 1500-1900: the influence of the Erudits, Précieuses, Philosophes, and Romanticists; spelling reforms. *Five hours a week, winter quarter.* Professor Holmes.

### Courses Primarily for Graduates

101. STUDIES IN ROMANTICISM. Prerequisite, French 15.
Seminar course. Intensive study of one of the romantic poets. (Offered in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Dey.

105-106. FRENCH LITERATURE OF THE RENAISSANCE.
A study of French literature of the Sixteenth Century. Italian and French humanism. The reformation. Marot, Rabelais, Calvin, the Pléiade, Montaigne. (Offered in 1930-1931 and in alternate years.) *Five hours a week, winter and spring quarters.* Professor Lyons.

108. FRENCH LITERATURE OF THE 14TH AND 15TH CENTURIES. Prerequisite, French 105 or 121.
A combination of literary survey and reading course. Especial attention will be paid to Villon, who will be read entire with commentary. General treatment of such writers as Machaut, Froissart, Christine de Pisan, etc. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Holmes.

110. HISTORY OF FRENCH LITERATURE PRIOR TO 1300.
Lectures and seminar papers. A complete and careful study of the origins of French literature, with emphasis upon the twelfth century Renaissance, the period of the epics, beginning of romances, etc. French 121 is desired, though not a prerequisite. (Offered in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Holmes.

121-122-123. OLD FRENCH.
Reading of the oldest texts: La Chanson de Roland; Aucassin et Nicolette; Chrétien de Troyes. Lectures on French Phonology and Morphology. *Five hours a week, fall, winter, and spring quarters.* Professor Holmes.

125. PROVENCAL.
A study of the ancient language and literature of Provence. The poetry of the Troubadours. (Offered in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Holmes.

131. FRENCH SYNTAX.
The most important phases of modern French syntax studied from a historical point of view. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Dey.

141. RESEARCH.
Research in a special field under the direction of a member of the department.

CELTIC 105. MIDDLE IRISH.
Grammar and reading of texts. Dottin, *Manuel de l'Irlandais Moyen, Táin Bó Cúailnge* (supplement to *Eriu*). *Five hours a week, winter quarter.* Professor Holmes.

## SPANISH

### Courses for Graduates and Advanced Undergraduates

11. LOPE DE VEGA AND HIS CONTEMPORARIES. Prerequisite, Spanish 6.
Reading of representative plays of Lope de Vega, Tirso de Molina, Guillén de Castro, Ruiz de Alarcón, etc. Lectures and reports. (Offered in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Leavitt.

12. CALDERON AND HIS CONTEMPORARIES. Prerequisite, Spanish 6.
Reading of representative plays of Calderón de la Barca, Moreto, Rojas, etc. Lectures and reports. (Offered in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Leavitt.

15. EARLY LYRIC POETRY. Prerequisite, Spanish 6.
A survey of lyric poetry in the Spanish peninsula from the origins through the Siglo de Oro. (Offered in 1929-1930 and in alternate years.) *Five hours a week, fall quarter.* Professor Adams.

16. MODERN LYRIC POETRY. Prerequisite, Spanish 6.
Brief treatment of the poetical schools of Seville and Salamanca in the eighteenth century and study of Spanish lyric poetry through the nineteenth century to the present day. (Offered in 1929-1930 and in alternate years.) *Five hours a week, winter quarter.* Professor Adams.

17. SPANISH DRAMA OF THE NINETEENTH CENTURY. Prerequisite, Spanish 6.
Reading of representative plays of this period. Lectures, oral and written reports. (Offered in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professor Leavitt.

18. MODERN SPANISH DRAMA. Prerequisite, Spanish 6.
Reading of plays of Dicenta, Benavente, Linares Rivas, the Alvarez Quintero brothers, Marquina, Martínez Sierra, etc. Lectures, oral and written reports. (Offered in 1930-1931 and in alternate years.) *Five hours a week, winter quarter.* Professor Leavitt.

19. EARLY SPANISH PROSE FICTION. Prerequisite, Spanish 6.
A study of the origins and developments of the novel in Spain up to the time of Cervantes. (Offered in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professor Adams.

20. THE SPANISH NOVEL. 1605-1898. Prerequisite, Spanish 6.
A survey of the novel from Cervantes through the nineteenth century. (Offered in 1930-1931 and in alternate years.) *Five hours a week, winter quarter.* Professor Adams.

21. MODERN SPANISH NOVELISTS. Prerequisite, Spanish 6.
A study of the "Generation of '98," with consideration of present day tendencies. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Adams.

**Courses Primarily for Graduates**

121-122. EARLY SPANISH.

Ford's *Old Spanish Readings.* The Poem of the Cid. Spanish literature to the sixteenth century. *Five hours a week, fall and winter quarters.* Professor Kane.

123. EARLY SPANISH LITERATURE. Prerequisite, Spanish 121-122.

Seminar course. Intensive study of one representative author of this period. *Five hours a week, spring quarter.* Professor Kane.

127. SPANISH ROMANTICISM. Seminar course.

General survey of the Romantic period in Spain and investigation of special problems. (Offered in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Adams.

131. INTRODUCTION TO SPANISH-AMERICAN LITERATURE.

A study of notable authors and consideration of present-day writers. (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Leavitt.

141. RESEARCH.

Research in a special field under the direction of a member of the department.

Attention is called to Comparative Literature 58.

## ITALIAN

**Courses for Graduates and Advanced Undergraduates**

11. ITALIAN LITERATURE OF THE RENAISSANCE. Prerequisite, Italian 1 and 2.

Readings from the principal authors, with special emphasis on Ariosto, Machiavelli, Castiglione, and the lyric poets. Collateral reading on the history of Italian culture during the Renaissance. *Five hours a week, winter quarter.* Professor Huse.

12. DANTE. Prerequisite, Italian 1 and 2.

The *Vita Nuova* and the *Inferno*, with some reference to origins of Italian literature and to the poets of the *Dolce stil nuovo.* (Offered in 1929-1930 and in alternate years.) *Five hours a week, spring quarter.* Professor Huse.

13. DANTE. Prerequisite, Italian 12.

The *Purgatorio* and the *Paradiso.* (Offered in 1930-1931 and in alternate years.) *Five hours a week, spring quarter.* Professor Huse.

56. DANTE IN ENGLISH TRANSLATION.

The *Vita Nuova* and the *Divine Comedy*; the precursors of Dante and the poets of the *Dolce stil nuovo.* Special studies of Dante's political and social philosophy, with particular emphasis on Dante as a poet and as a guide. Five *hours a week, fall quarter.* Professor Huse.

**Courses Primarily for Graduates**

121. OLD ITALIAN.

Reading of the poets previous to Dante. Early monuments. Survey of phonology and morphology. (Offered in 1930-1931 and in alternate years.) *Five hours a week, fall quarter.* Professor Holmes.

## DEPARTMENT OF RURAL SOCIAL-ECONOMICS

EUGENE CUNNINGHAM BRANSON, Professor.
SAMUEL HUNTINGTON HOBBS, JR., Associate Professor.
PAUL WOODFORD WAGER, Assistant Professor.

The seminar library of the Department of Rural Social-Economics is perhaps the best library of its sort in the United States, particularly in county government, rail-and-water transportation, the country church, farm tenancy, land economics, and state-aid to land ownership. It is well equipped with the rare literature of its special field of learning, with standard texts and reference volumes, current reports, bulletins, pamphlets, journals, magazines, and newspaper clippings, etc. It is also a clearing house of information about North Carolina—economic, social, and civil. The files of mounted clippings in rural-social-economic-civic subjects are indexed in accord with the index system of the general library.

Publications of the department consist of the North Carolina Club Year-Book containing particular studies of state-wide problems, and fifty numbers each year of the *University News Letter,* which for this the fifteenth year has been filled with particular economic-social-civic studies of county, state, and national affairs.

### Courses for Graduates and Advanced Undergraduates

20. NORTH CAROLINA: ECONOMIC AND SOCIAL.

Designed to familiarize the student with North Carolina: population, agriculture, resources, social life, economic development, industry. *Five hours a week, fall or spring quarter.* Professor Hobbs.

### Courses for Graduates

105abc. RURAL SOCIAL PROBLEMS.

Designated readings on and class discussions of (1) the solitary farmstead and the country community, (2) farm tenancy, (3) country illiteracy, (4) the country school, (5) the country church, and (6) rural citizenship. *Five hours a week, fall, winter, and spring quarters.* Professor Branson.

113abc. RURAL ECONOMICS.

Research, seminars, and field investigations in (1) land economics—resources, values, ownership and tenancy, laws and policies; (2) farm organization and management—farm systems, farm finance, distribution of farm products and the farm income, coöperative farm enterprise; (3) country wealth, country institutions and problems; (4) state and county studies, economic, social, and civic, county bulletins, etc. Required preliminary preparation: approved courses in general and rural economics. Lacking such preparation, collateral courses in these subjects must be taken in residence here. *Five hours a week, fall, winter, and spring quarters.* Professors Branson, Hobbs, Wager.

117abc. RURAL SOCIAL PROBLEMS.

1. Research, seminars, and field investigations of (1) rural social institutions and agencies, (2) transportation and communication facilities in rural areas, (3) country-mindedness and its sequences, (4) town and country interdependences, (5) social disability in country areas, our public welfare laws and agencies, (6) social aspects of tenancy and illiteracy, (7) state and county studies, economic, social, and civic, county bulletins, etc. 2. Rural social surveys; research, technic, and field work. 3. Statistics; interpretation and use. 4. Rural social engineering: (1) county community studies; (2) community organization, economic and social; (3) county government; (4) country leadership, requisites and technic. Required preliminary preparation: approved courses in general and rural sociology. Lacking this, collateral courses in these subjects must be taken in residence here. *Five hours a week, fall, winter, and spring quarters.* Professors Branson, Hobbs, Wager.

## DEPARTMENT OF SOCIOLOGY

HOWARD W. ODUM*, ERNEST R. GROVES, HAROLD D. MEYER, L. L. BERNARD, T. J. WOOFTER, JR., Professors.

WILEY B. SANDERS, GUY B. JOHNSON, RUPERT VANCE, Associate Professors.

H. G. DUNCAN, Acting-Associate Professor.

The work in Sociology in the University is organized around the Department of Sociology and the School of Public Welfare. For complete announcement of all courses and details concerning the School, see the special bulletin of announcements.

To meet the specific needs of the state and the University, and to some extent the South, a four-fold service has been planned. The first emphasizes instruction in sociology and social problems, including teaching in the College and University, extension teaching through the Extension Division or outside communities, and through general instruction and promotion of citizenship. The second emphasizes training for social work and community leadership, with special reference to town, village, and rural communities, and with special application to the State of North Carolina and the South. This division hopes to meet the very urgent demands of the state for trained men and women for its county superintendents of public welfare and other official positions, and of many communities throughout the South for Red Cross secretaries and other community workers in the mill villages and elsewhere. The third aspect of the work emphasizes direct and indirect community service, or social engineering through avenues of community leaders, county superintendents of public welfare, local and district conferences, and community planning for leaders, industrial managers, and others. The fourth aspect emphasizes social research, scientific inquiry, and publication of results estimated to be of value to the state, the University, and to the general field of public welfare and social progress. A fifth general purpose, kept constantly in the foreground, provides that the school maintain close and cordial coöperation with the State Department of Public Welfare, with other state departments of public service, with other departments and schools of the University, and with local and voluntary agencies.

The Department of Sociology, like those of Economics, Government, Rural Social-Economics, and Education, works in close coöperation with the Institute for Research in Social Science, attempting to select the most important topics for fruitful research, to find available students to do the research, and to direct its progress. Among the subjects for special research this year are a half-dozen inquiries into social-industrial relationships. Other topics relate to rural leadership, to leadership in the South, studies in community organization, in poor relief, in juvenile delinquency, in public welfare, studies of crime in North Carolina.

5. NEGRO PROBLEMS.

A study of the race problems of the South, with consideration of the history, economic and social status, and future of the Negro. Standards of measurement for race progress; race relationships; the specific problems of the here and now of Southern race relations. *Five hours a week, fall quarter.* Professor Woofter or Professor Johnson.

6. PROBLEMS OF IMMIGRATION.

A study of immigrant backgrounds; the problems confronting the immigrant and the problems created by his presence in the United States; the processes involved in the assimilation of the immigrant, his children, and his grandchildren into our cultural life. *Five hours a week, fall quarter.* Professor Duncan.

*Absent on leave, 1928-1929.

8. COMMUNITY ORGANIZATION.
The community as a unit of work, problems of modern community life, principles underlying community organization, experiments in methods of community organization, development and coördination of community activities illustrated by case records, problems of community leadership. A critical review of the role of custom, habit, crisis, and gregariousness in community development. Special attention is given to the place of the crowd spirit in community work and to effective means of achieving community solidarity. An evaluation of community forces with a view to discovering the principles involved in their organization and coördination. (Not to be given in 1929-1930.) *Five hours a week, fall quarter.* Professor ————.

9. ADMINISTRATION OF COMMUNITY WORK.
A general survey of typical experiments in community organization; development and coördination of community activities illustrated by case records; a comparative study of methods and administration with special attention to problems of central financing of social agencies; qualifications for leadership in community work. (Not to be given 1929-1930.) *Five hours a week, spring quarter.* Professor ————.

11. MARRIAGE AND THE FAMILY.
A discussion of the problems of marriage and the family and their relation to contemporary social conditions with emphasis upon normal and successful matrimony and parenthood. *Five hours a week, spring quarter.* Professor Groves.

12. CRIME AND ITS SOCIAL TREATMENT.
Nature and causes of crime; evolution of modern methods of criminal procedure; administration of penal and reformatory institutions; programs for the social treatment of the criminal; the problems of juvenile delinquency. The class work will be supplemented by field trips to criminal courts and penal institutions. *Five hours a week, winter quarter.* Professor ————.

13. SOCIAL PATHOLOGY.
A survey of the abnormal and pathological aspects of society. Among the problems studied are feeblemindedness, insanity, physical defectiveness, malnutrition, alcoholism, prostitution, vagrancy, family disorganization. Emphasis is given to methods of treatment by private and public institutions and agencies. Case work is supplemented by field trips to county and state institutions. *Five hours a week, spring quarter.* Professor ————.

14. FAMILY CASE WORK.
Discussion of the relation of the individual to the family and the family to the community. The technique of case work and its scientific approach—methods of investigation, interviewing, social evidence, sources, diagnosis, treatment. Class work is supplemented by visits to social agencies in neighboring cities and by field work under the supervision of members of the staff of the School of Public Welfare. *Five hours a week, fall or spring quarter.* Professor Sanders.

15. ADVANCED FAMILY CASE WORK.
A continuation of Sociology 14, with more intensive study of case work *Five hours a week, winter or spring quarter.* Professor Sanders.

23. THE THEORY OF PLAY AND RECREATION.
The theories of play, play activities, attitudes, history of the play movement, play leadership, programs, values, sex and age differences, classification of movements, application to community life. *Three hours a week, winter quarter.* Professor Meyer.

28. JUVENILE DELINQUENCY.
This course deals with the diagnosis and treatment of juvenile delinquency from the social worker's viewpoint. Under *diagnosis* will be taken up the methodology of the social scientists in this field, and the evaluation of the different causative factors of juvenile delinquency. Under *treatment* will be covered the work of the juvenile court, probation, parole, and institutional care. *Five hours a week, winter or spring quarter.* Professor Sanders.

29. THE PUBLIC CARE OF CHILDREN.
This course is intended primarily for students who expect to follow social work as a profession. The major part of the course will be devoted to the study of the methods and technique of the social agencies engaged in the social treatment of the different classes of children who stand in need of public care and protection, such as, the delinquent child, the dependent or neglected child, the defective child, and children in employment. The latter part of the course will be devoted to a discussion of public responsibility for the welfare of children in general, especially from the standpoint of education, health, and maintenance. *Five hours a week, winter quarter.* Professor Sanders.

40. THE ORGANIZATION AND ADMINISTRATION OF PUBLIC WELFARE.
1. The organization of Public Welfare in the United States. 2. Detailed study of the North Carolina Plan. 3. Office organization and administration. Alternates with 41. (Not given in 1929-1930.) *Five hours a week, fall quarter.* Professor ————.

41. SOCIAL LAWS.
The development of social legislation pertaining to important social problems. Special attention to social laws of North Carolina. Alternates with 40. (Given in 1929-1930.) *Five hours a week, fall quarter.* Professor ————.

45. SOCIAL ANTHROPOLOGY.
The origins, types, development, and distribution of culture, with emphasis upon the modern cultural environment and its selective influence. *Five hours a week, fall quarter.* Professor Bernard.

**Courses Primarily for Graduates**

105. SOCIAL ORIGINS AND SOCIAL CHANGE.
The factors producing cultural change and the effects of cultural accumulation, cultural conflicts, and cultural dominance. *Five hours a week, fall quarter.* Professor Bernard.

107. THE ADVANCED STUDY OF SOCIAL PROBLEMS.
A general course integrating social problems and social theory with the following general divisions: teacher and student, a general approach, the spirit and method of science, society and the good life, the individual, leadership, social change and social problems, physical background of society, social incidence and social emergencies, international, national, and regional problems, race, the Negro in America, immigration and social population, the family, community, the city, problems of country life, business, labor, maladjustment and social waste, social planning, social work and public welfare, social progress, values, social science and guidance. *Five hours a week, fall, winter, or spring quarter.* Professor Odum.

108. METHODS IN SOCIAL RESEARCH.
Outlines of social research including the spirit of scientific research, social research and the new alignment of the social sciences, the historical approach to the social sciences, the qualifications of the social research specialist, the divisions and general methods of social science, types of method and approach:

the statistical, the survey; the experimental, the case; the biological, the psychological; the anthropological or comparative, the historical; the range of general sources, research agencies and groups, reading and bibliography as tools, the utilization of notes and records, schedules, questionnaires and forms, common sense technique, preparation of manuscript and publication, examples of social research and bibliographies. *Five hours a week, fall quarter.* Professors Odum, Woofter.

109. SOUTHERN REGIONAL SOCIAL PROBLEMS.
An extended survey of the field of regional social problems in the southern states, classified and grouped under certain sociological categories and physical backgrounds, cultural patterns, processes of social change, social incidence, individual and social differentiation, institutions and leadership, social programs, social science, and social research. Topical analysis and extensive questions supplemented with concrete data and special thorough study of given selected problems. *Five hours a week, winter quarter.* Professor Odum.

121. ADVANCED PRINCIPLES OF SOCIOLOGY.
A graduate course in the study of advanced social theory and research into selected aspects of the field. *Five hours a week, winter or spring quarter.* Professor Bernard.

122. EDUCATIONAL SOCIOLOGY.
An advanced course in the study of scientific programs of social progress. Objective measurement of social influences and social groups. Research into some specific problems relating to one of the large institutions. *Five hours a week, winter or summer quarter.* Professor Groves.

123. HISTORICAL SOCIOLOGY.
A study of the leading social theorists and their contributions to human thought and welfare. Research into the theories of some selected writer. *Five hours a week, spring quarter.* Professor Odum.

127-128-129. GRADUATE RESEARCH SEMINARS.
Research in selected topics. *Five hours a week, fall, winter, and spring quarters.* Professor Odum.

130-131-132. GRADUATE RESEARCH SEMINARS.
Research in special topics. *Five hours a week, fall, winter, and spring quarters.* Professor Groves.

134. EUROPEAN SOCIOLOGY.
The development of social thinking from the earliest times to the present, with particular emphasis upon recent trends and schools. *Five hours a week, fall quarter.* Professor Bernard.

135. AMERICAN SOCIOLOGY.
Social thought in the nineteenth and twentieth centuries, stressing especially the recent tendencies in sociological theory and investigation. *Five hours a week, winter quarter.* Professor Bernard.

136. RECENT SOCIOLOGICAL THEORY.
An intensive developmental study of some phase of recent sociological theory. The field selected will vary from year to year. In 1929 Cultural Sociology has been chosen, and in 1930 Psychological Sociology will probably be covered. *Five hours a week, spring quarter.* Professor Bernard.

141. SEMINAR.
Individual research in a special field under the direction of a member of the department.

## DEPARTMENT OF ZOOLOGY

HENRY VANPETERS WILSON, ROBERT ERVIN COKER, Professors.
CHARLES DALE BEERS, Assistant Professor.

Those who find themselves strongly interested in zoölogy will meet with opportunities for teaching and investigation in several of the subdivisions of present-day universities, such as college, technological, medical, and graduate schools. Others will find their best opportunity, especially if their interest centers around problems of cellular biology, in research institutions of a more or less medical character. Museums need the service of many zoölogists as curators. Curators are expected to acquire intimate and extensive knowledge of the classification and natural history of some particular group. Somewhat the same kind of specialization is demanded of those who are drawn into institutions for the betterment of public health, some concentrating on the parasitic worms, etc. There is, finally, much work of an economic nature that is carried on by zoölogists in the service of national and state bureaus, such as the U. S. Bureau of Fisheries and the several bureaus under the U. S. Department of Agriculture.

The department occupies, along with the Department of Botany, the biological building, known as Davie Hall, a description of which is contained in the University catalogue. The department is provided with the usual equipment of books, collections, and instruments, including excellent photographic apparatus, for graduate work. The departmental library receives the American and the more important foreign journals. It has a good working collection of treatises and monographs and a large collection of reprints. The department is prepared to direct research on the general problems of cellular biology as presented in the embryological and regenerative process of animals, more especially the lower metazoa (sponges and coelenterates) and lower vertebrates (fishes and amphibia); on the ecology of lower aquatic animals; on the phenomena of variation as exemplified in the classification of sponges, and on the life-cycles of protozoa from the comparative and experimental standpoints. Investigations along these lines have now been carried on for many years. The published records have appeared from time to time in the zoölogical journals (*Journal of Morphology, Journal of Experimental Zoölogy, Memoirs Museum Comparative Zoölogy, Bulletin U. S. Bureau of Fisheries, Bulletin U. S. National Museum, Anatomischer Anzeiger, Journal Elisha Mitchell Scientific Society, American Naturalist, Proceedings National Academy of Sciences, British Journal of Experimental Biology,* etc.) and the chief data have been incorporated in treatises that are in general use. Opportunity to carry on investigations at the seaside may usually be obtained during the summer at the biological station of the U. S. Bureau of Fisheries situated at Beaufort, N. C.

The courses listed below are such as lead more especially to the master's degree (A.M. or S.M.). For the Ph.D. degree the essential requirement is that the candidate shall have such a grasp of the concepts and methods of zoölogy as will enable him independently to acquire knowledge of some importance that is new to science. This depends not only on manipulative skill and experience but also on ability to handle the literature of the subject, the treatises, hand-books, and especially the current journals. A reading knowledge of French and German is required of candidates for the Ph.D. degree.

### Courses for Graduates and Advanced Undergraduates

3. COMPARATIVE ANATOMY OF VERTEBRATES. Prerequisite, Zoölogy 1 (ab) and 2 (ab).

Dissection of types especially amphioxus, petromyzon, fish, fowl, rabbit. Laboratory work with occasional lectures. *Ten laboratory hours a week, fall quarter. Laboratory fee, $5.00.* Professor Wilson.

4. COMPARATIVE EMBRYOLOGY OF VERTEBRATES. Prerequisite, Zoölogy 1 (ab) and 2 (ab).

Maturation and fertilization phenomena in some invertebrate types; segmentation and formation of germ layers in frog and teleost fish; germ layers and development of characteristic vertebrate organs in chick; essentials of microscopic technique. Laboratory work with occasional lectures. *Ten laboratory hours a week, winter quarter. Laboratory fee, $5.00.* Professor Wilson.

5. COMPARATIVE HISTOLOGY OF VERTEBRATES. Prerequisite, Zoölogy 4.

Microscopic preparations of selected tissues and organs are made from the fresh animal and studied with the help of texts and original papers. Laboratory work with assigned reading and seminar reports. *Ten laboratory hours a week, spring quarter. Laboratory fee, $5.00.* Professor Beers.

6-7-8. MORPHOLOGY AND CLASSIFICATION OF THE INVERTEBRATES. Prerequisite, Zoölogy 1 (ab) and 2 (ab).

Dissection and microscopic study of types of the chief orders, with some consideration of life histories; systematic diagnosis. Laboratory work with occasional lectures. *Six laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $3.00 a quarter.* Professor Wilson.

9. INTRODUCTION TO HYDROBIOLOGY. Prerequisite, Zoölogy 1 (ab) and 2 (ab).

A study of animal life in water, with special reference to the relation of animals to each other and to their environments. Field and laboratory work, lectures, reading of special papers, discussions. *Five hours (lectures and equivalent laboratory) a week, fall quarter. Laboratory fee, $5.00.* Professor Coker.

10. INTRODUCTION TO PROTOZOOLOGY. Prerequisite, Zoölogy 1 (ab) and 2 (ab).

A consideration of the structure, classification, and life histories of the one-celled animals, with special reference to those of medical importance—in particular, the intestinal protozoa and the causative agents of malaria and the sleeping sicknesses. *Lectures and demonstrations, five hours a week, winter quarter.* Professor Beers.

### Courses Primarily for Graduates

109-110-111. GENERAL EMBRYOLOGY AND REGENERATION.

Embryology and regeneration in the lower metazoa and simpler vertebrates. *Not less than ten laboratory hours a week, fall, winter, and spring quarters. Seminar reports. Laboratory fee, $5.00 a quarter.* Professor Wilson.

112-113-114. HYDROBIOLOGY. Prerequisite, Zoölogy 9.

The study of aquatic organisms and environments, with attention restricted to a particular topic, as a small group of animals, a limited set of habitats, or special phenomena of behavior. The work is on the border line of research, involving critical examination of literature, as well as field and laboratory study and seminar reports. *Ten laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $5.00 a quarter.* Professor Coker.

115. PROTOZOOLOGY.

Special study of the protozoa living in man and lower animals, with consideration of host-parasite relationships and with comparative studies on a few free-living forms. Laboratory work with occasional lectures, assigned readings, and seminar reports. *Ten laboratory hours a week, fall or spring quarter. Laboratory fee, $5.00.* Professor Beers.

116. RESEARCH.
Under this heading may be credited the work of a single quarter or that of one or more years. *Six or ten or more laboratory hours a week, fall, winter, and spring quarters. Laboratory fee, $3.00 or $5.00.* Professor Wilson or Professor Coker or Professor Beers.

## ADDITIONAL COURSES FOR GRADUATE CREDIT

Certain courses in the professional schools may be elected as minors for graduate credit, with the permission of the committee under which the student is working and the administrative board.

In the School of Law the following courses are open to properly qualified graduate students: Negotiable Instruments, Municipal Corporations, Carriers, Insurance, Sales, Corporations, Constitutional Law, Criminal Law, Evidence, Persons.

In the School of Medicine the following courses are open to graduate students who present the proper prerequisites: Anatomy 2, General Histology and Organology; Anatomy 3, Cytology and Histogenesis; Anatomy 4, Embryology; Anatomy 5, Central Nervous System and Organs of Special Sense; Bacteriology 4, Infection, Immunity, and Serum Diagnosis; Bacteriology 6, Advanced Bacteriology and Research; Advanced Pharmacology.

(For a full statement concerning the courses listed above, the student is referred to the general catalogue of the University and the special bulletins of the schools.)

For the convenience of students, courses in Physiological Chemistry offered in the Medical School are reprinted below. They may be pursued as minors for the degree of Doctor of Philosophy in an allied department and as majors leading to the master's degree. Attention is called to the prerequisites for such courses: Physiological Chemistry 1 and 2; Chemistry 1, 2, 31, 42, 61, 62 or their equivalents, and preferably Chemistry 81 and 82.

5. BIOCHEMICAL METHODS. *Five hours a week, spring quarter.* Professor Brooks.

6. BIOCHEMICAL PREPARATIONS. Prerequisite, Physiological Chemistry 5.
Biochemical preparations. Laboratory work applying the methods and theories of physiological chemistry 5 to the preparation of creatine, creatinine, amino acids, etc. *Three three-hour laboratory periods weekly, spring quarter. Laboratory fee, $10.00.* Professor Brooks.

7. QUANTITATIVE METHODS OF BLOOD AND URINE ANALYSIS. *Two lectures, and two three-hour laboratory periods weekly, fall, winter, and spring quarters. Laboratory fee, $5.00.* Professor Brooks.

20abc. RESEARCH IN PHYSIOLOGICAL CHEMISTRY. Prerequisite, Physiological Chemistry 2, 5.
Research on problems not requiring clinical material. *Fall, winter, and spring quarters. Laboratory fee, $10.00.* Professors Manning, Brooks.

5abc. ADVANCED PHYSIOLOGICAL CHEMISTRY. Seminar course: readings and discussions of recent advances in physiological chemistry. *One lecture and four library hours a week, fall, winter, and spring quarters.* Professors Manning, Brooks.

## TEACHING FELLOWS, 1928-1929

GEORGE CLINTON HOLROYD, S.B. in Chem., *Chemistry.*
SAMUEL MANER MARTIN, JR., B.S., *Chemistry.*
DAVID TUTTLE MILNE, A.B., *Chemistry.*
VAN COURTLANDT ELLIOTT, A.B., *Classics.*
MAXWELL GALBRAITH PANGLE, A.M., *Economics.*
WILLIAM EARLE DRAKE, A.M., *Education.*
GEORGE MCNEILL ROSE, JR., S.B. in Elec. Eng'g., *Electrical Engineering.*
GEORGE FRANK SENSABAUGH, A.B., *English.*
HERMAN EVERETTE SPIVEY, A.B., *English.*
ROBERT MARSDEN WALLACE, A.B., *English.*
IRVING LEE MARTIN, S.M., *Geology.*
JESSE MAYNARD HUGGINS, A.B., *German.*
CARL HAMILTON PEGG, A.M., *History and Government.*
†COLVIN WOOD SALLEY, A.B., *History and Government.*
JAMES ERIC MERRITT, A.B. in Educ., *History and Government.*
*JOHN BAUGHAM HARRISON, A.B., *History and Government.*
EDWARD ALEXANDER CAMERON, A.B. in Educ., *Mathematics.*
EDWARD CALEB COKER, JR., B.S., *Mathematics.*
PAUL JAMES STEELE, B.S., *Physics.*
ABRAM BAYROFF, B.S., *Psychology.*
†PHILIP LESTER BOARDMAN, A.M., *Romance Languages.*
‡CHARLES THOMAS LIPSCOMB, JR., *Romance Languages.*
ALFRED BYRON WHITE, A.B., *Romance Languages.*
**ARCHIBALD KENNETH SHIELDS, A.B., *Romance Languages.*
PAUL WALBERT SHANKWEILER, A.M., *Sociology.*
JOSHUA PAUL REYNOLDS, B.S., *Zoölogy.*

## ASSISTANTS IN INSTITUTE FOR RESEARCH IN SOCIAL SCIENCE***

HUGH PENN BRINTON, JR., A.M.
GRAHAM BENNETT DIMMICK, A.M.
KATHARINE JOCHER, A.M., *Assistant Director of the Institute.*
JOHN PAUL MCCONNELL, A.M.
HERSHAL LUTHER MACON, A.M.
GUSTAVE ERNST METZ, A.M.
ARTHUR FRANKLIN RAPER, A.M.

## GRADUATE ASSISTANTS

VELMA DARE MATTHEWS, A.M., *Botany.*
MARTHA REBECCA WARD, A.B., *Botany.*
DAVID RAMSEY ERGLE, S.M., *Chemistry.*
JOHN BRYANT GALLENT, S.M., *Chemistry.*
ARTHUR EDWARD HUGHES, B.S., *Chemistry.*
HARVEY ALBERT LJUNG, S.M., *Chemistry.*
WILLIAM JUDSON MATTOX, A.B., *Chemistry.*
ROBERT DILL NORTON, M.S., *Chemistry.*
CHARLES LAMAR THOMAS, S.B., *Chemistry.*
WILLIAM WALDO WILLIAMS, S.B., *Chemistry.*
TURNER GRIFFIN, S.B., *Engineering.*
WILLIAM JENNINGS BOLEN, S.B., *Engineering.*

*Appointed January 1, 1929.
†Resigned January 1, 1929.
‡Resigned March 15, 1929.
**Appointed March 15, 1929.
*** Includes only those registered in the Graduate School.

VINA MOSTELLER FENLEY, A.M., *English.*
GEORGE FREDERICK HORNER, A.M., *English.*
SAMUEL JESSE MCCOY, A.B., *English.*
MAURICE AUGUSTUS MOORE, JR., A.M., *English.*
WILLIAM JOHN OLIVE, A.B., *English.*
HARRY KITSUN RUSSELL, A.M., *English.*
EDWARD PINCKNEY VANDIVER, JR., A.M., *English.*
ARTHUR SPEECE WITHERS, A.B., *English.*
WINNIE MCGLAMERY, A.B., *Geology.*
MARGARET DEVER SLAVENS, A.M., *Geology.*
EZDA DEVINEY, A.B., *Zoölogy.*
JAMES THEOPHILUS PENNEY, A.M., *Zoölogy.*
THOMAS COBB WATKINS, B.S., *Zoölogy.*
MONROE CRAIG YODER, A.M., *Zoölogy.*

## GRADUATE SCHOLARS

VIRGINIA FRANCÉS DEAN, A.B., *Classics.*
MARY SILMEA LAWRENCE, A.B., *Classics.*
ELEANOR HOWLAND GRAVES, A.B., *Economics and Commerce.*
ELIZABETH ESTELLE CHESLEY, B.S., *English.*
CLISBY BLAKENEY DUBOSE, B.S., *English.*
MARTHA CRUMPTON HARDY, A.B., *English.*
DAVID BANCROFT JOHNSON, JR., A. B., *English.*
JOHN WALKER MCCAIN, JR., A.M., *English.*
VIRGINIA MOORING MCDANIEL, A.B., *English.*
JOSHUA WALLACE HILL, A.M., *History and Government.*
SAMUEL DENNY SMITH, A.M., *History and Government.*
WILLIAM EDWARD UZZELL, A.B., *History and Government.*
RUTH ESTILL HAMILL, A.B., *Psychology.*
KATHERYNE NEIL HENDRICKS, A.B., *Romance Languages.*